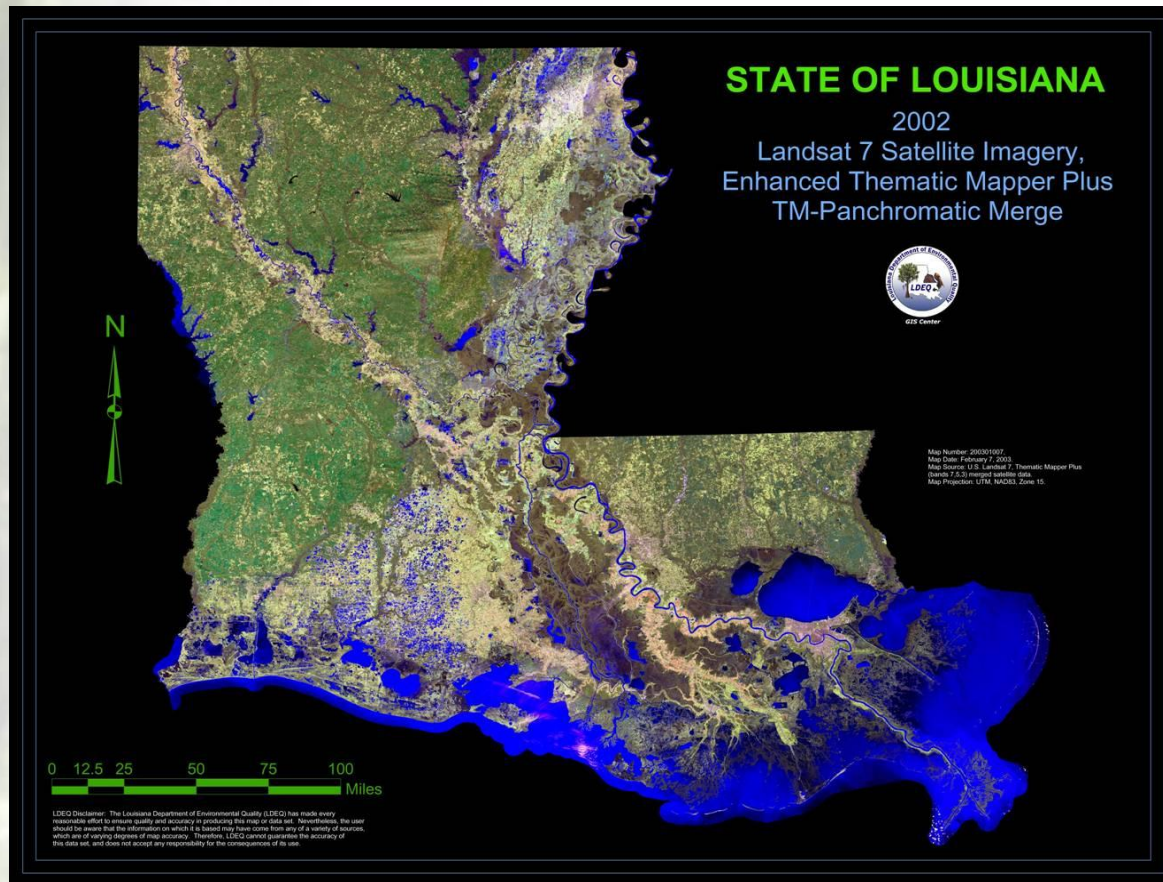




Louisiana Nutrient Reduction Strategy



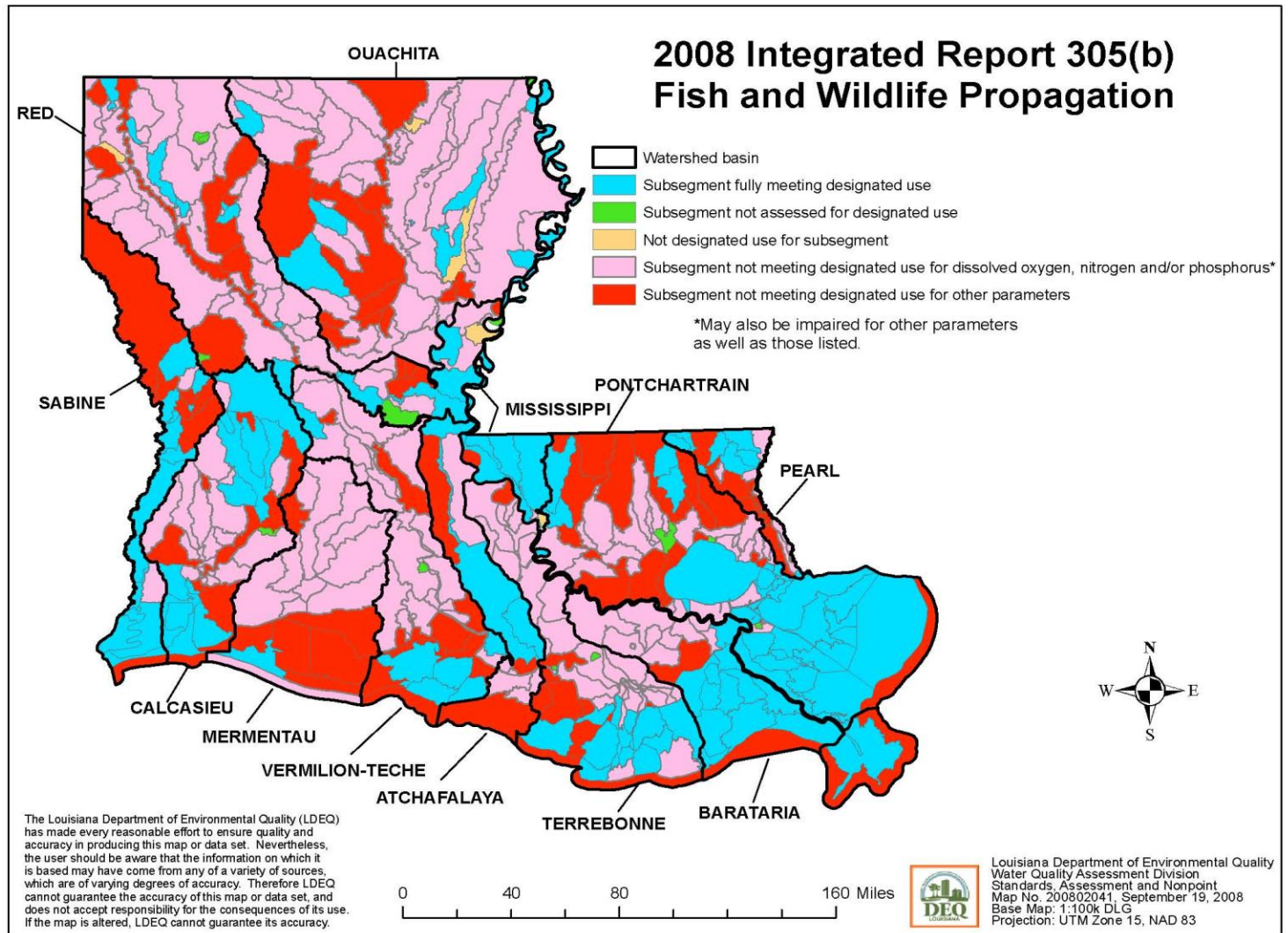
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Gulf of Mexico Alliance

- **Gulf Coast States met to Discuss a Template for Nutrient Reduction Strategies in late summer of 2009**
- **Louisiana is using that template for its strategy**

Where are the Problems in Louisiana?

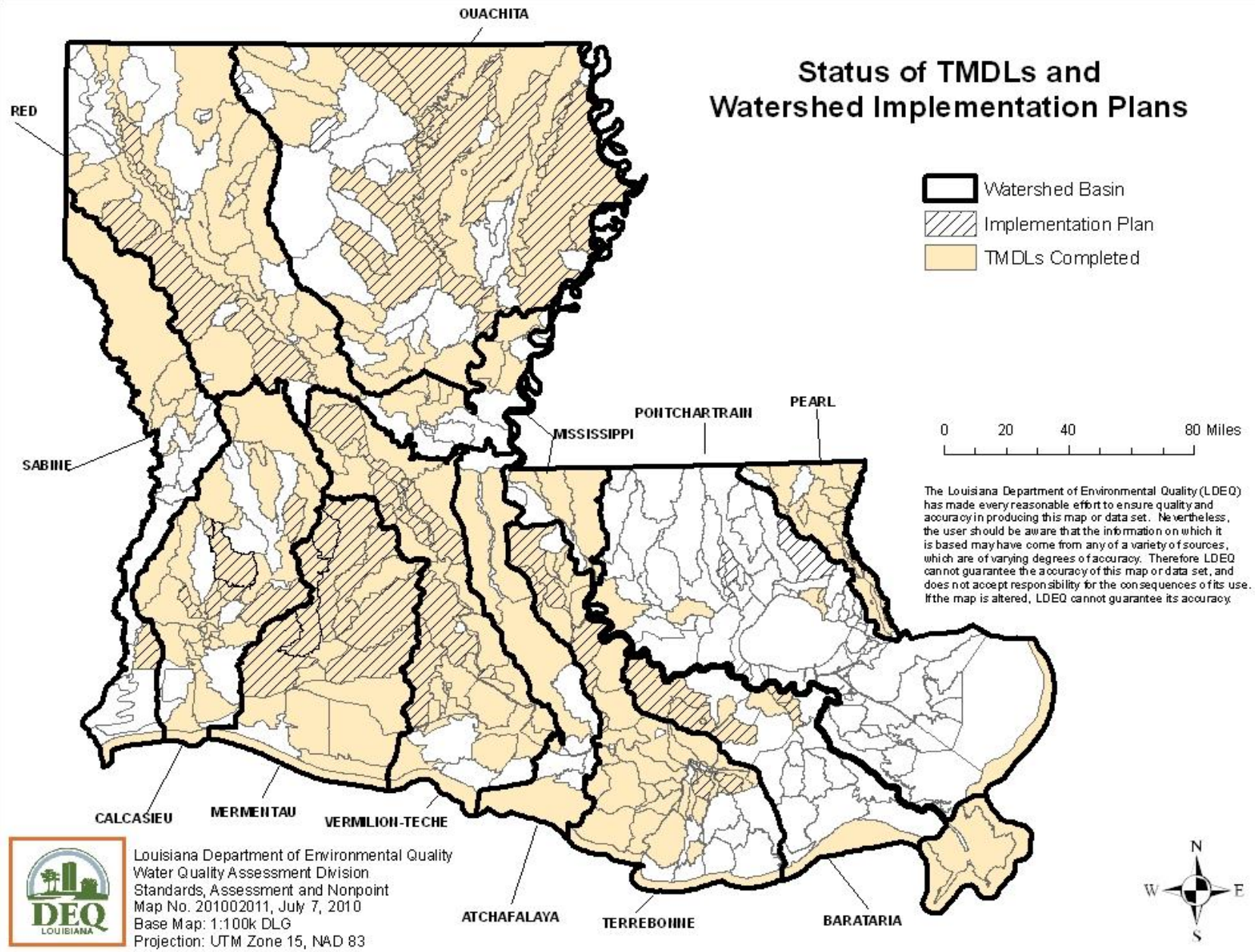




Total Maximum Daily Loads

Louisiana and EPA have completed more than 670 TMDLs since 1998 under the court ordered consent decree. Approximately 288 of these relate directly or indirectly to nutrient impairments.

Status of TMDLs and Watershed Implementation Plans



Louisiana Department of Environmental Quality
 Water Quality Assessment Division
 Standards, Assessment and Nonpoint
 Map No. 201002011, July 7, 2010
 Base Map: 1:100k DLG
 Projection: UTM Zone 15, NAD 83



Nonpoint Source Load Reductions

- **The TMDLs that have been completed indicate that from 15-100% of the pollutant load is from nonpoint sources of pollution.**



Anthropogenic Sources

- **Agricultural Runoff**
- **Storm Water Runoff from Cities**
- **Home Sewage Systems**
- **Industrial Discharges**
- **Municipal Discharges**
- **Atmospheric Deposition**



Louisiana's Nonpoint Source Program

- **A revised NPS Program is currently out for public review and comment until December 8th.**
- **Agricultural Programs include statewide efforts and watershed specific efforts to reduce nonpoint source pollution within Louisiana.**



Section 319 Grant

- **LDEQ applies for Section 319 Base Funds;**
- **LDAF applies for Section 319 Incremental funds;**
- **EPA is Placing Emphasis on Watershed Plans as the Basis for Section 319 Funding.**



Nonpoint Source Watershed Implementation Plans

- **EPA's 9 Key Elements**
- **Detailed GIS Land-Use Classification**
- **Coordination with USDA and State Office of Soil and Water Conservation**
- **Watershed Coordinators and Stakeholder Groups**



USDA Programs through the Farm Bill

- **Nutrient Management Plans**: an estimated 320,794 acres since 2004
- **Wetland Reserve Program**: approximately 217,300 acres of agricultural lands converted to bottomland hardwood forests



Mississippi River Basin Healthy Watersheds Initiative (MRBI) a USDA Program

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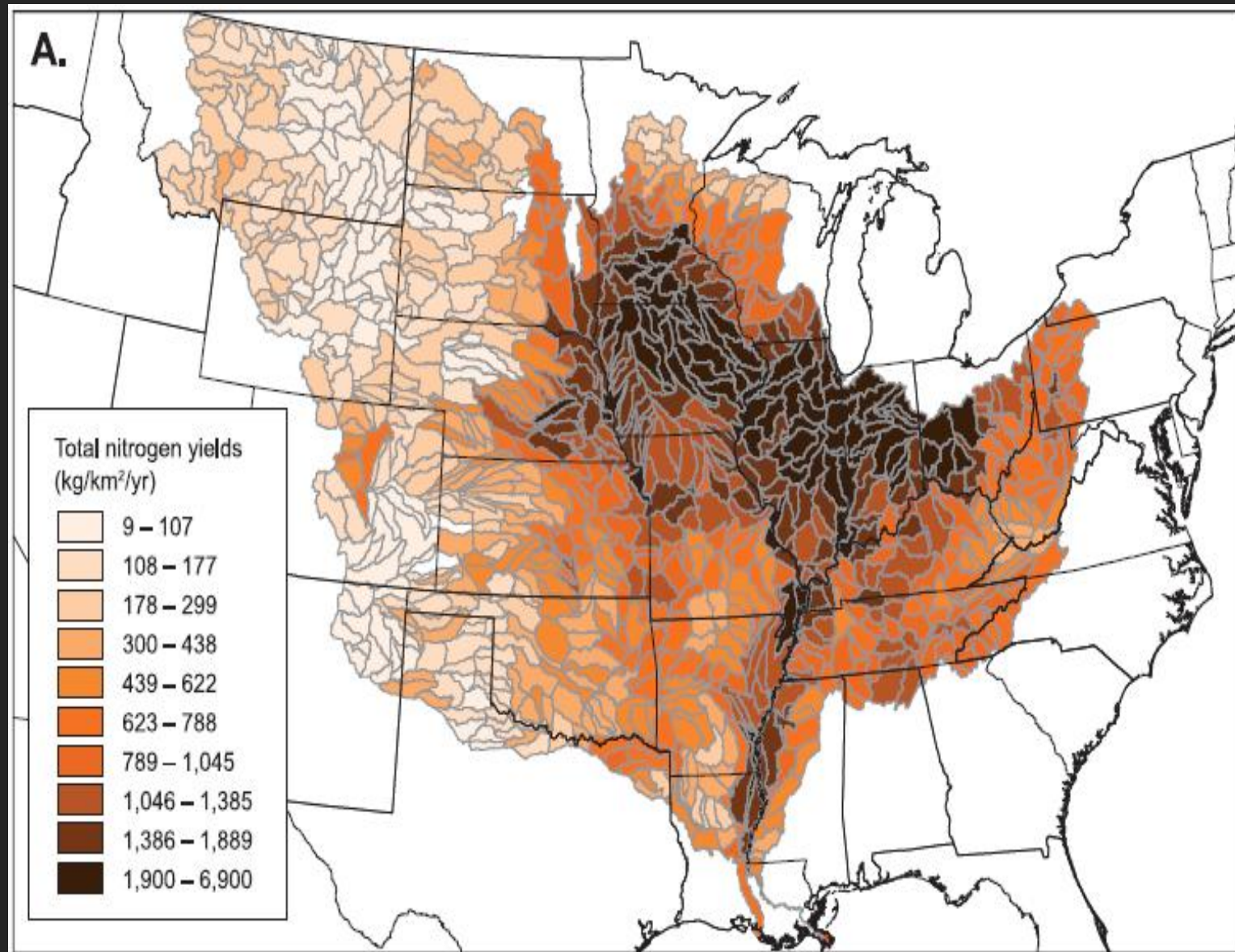
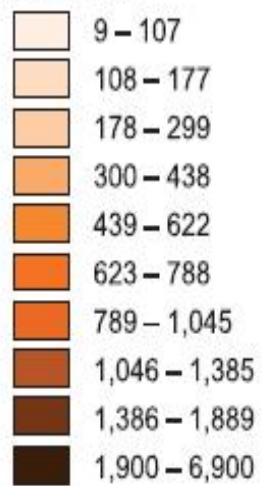


MRBI Goal

- **Improve the health of the Mississippi River Basin by:**
 - **Working with producers to help them voluntarily implement conservation practices which:**
 - **Avoid, control and trap nutrient runoff**
 - **Restore/enhance wildlife habitat**
 - **Maintain agricultural productivity**

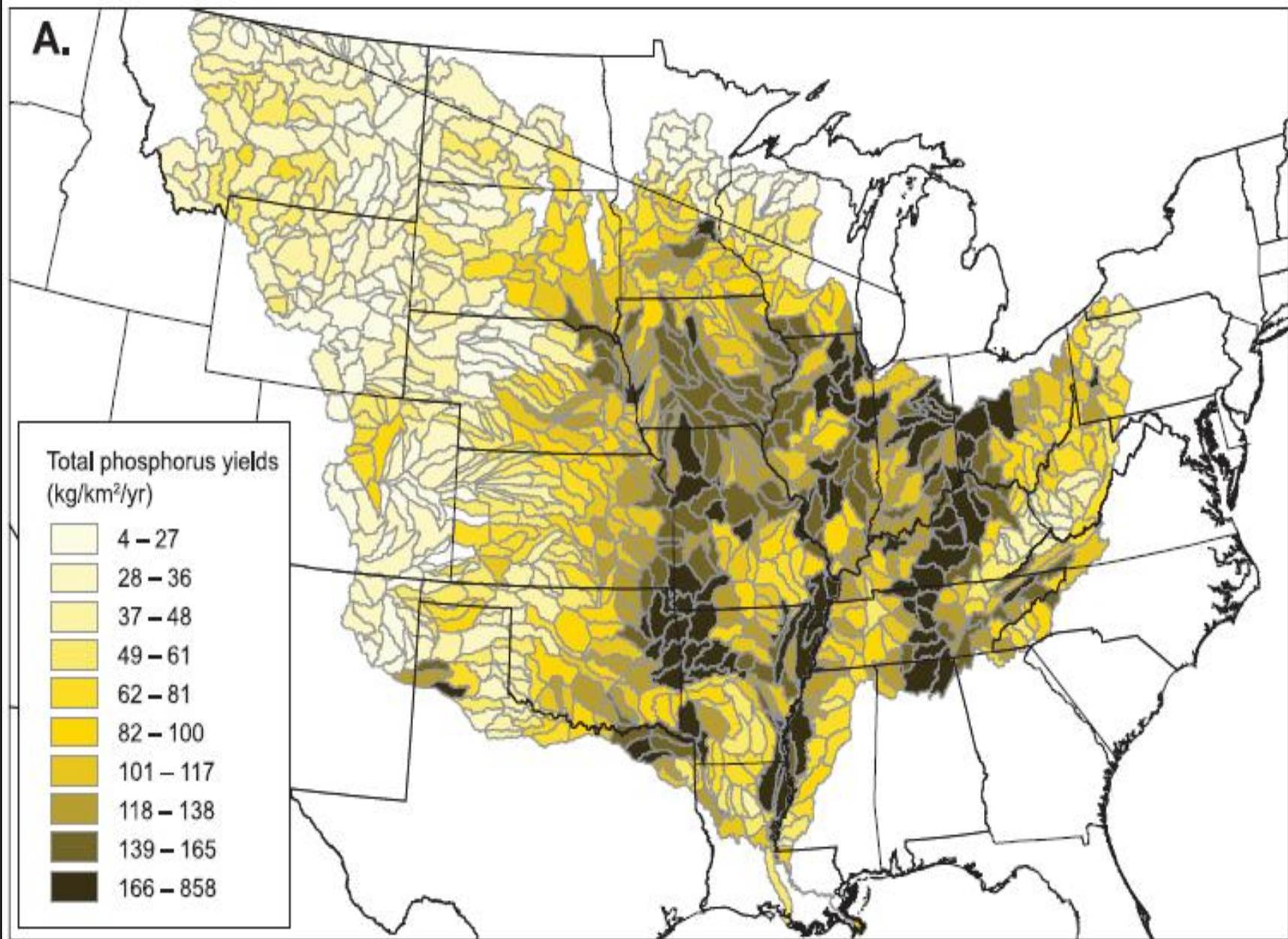
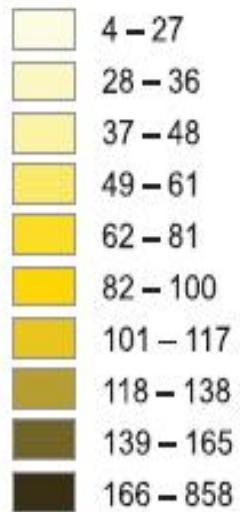
A.

Total nitrogen yields
(kg/km²/yr)



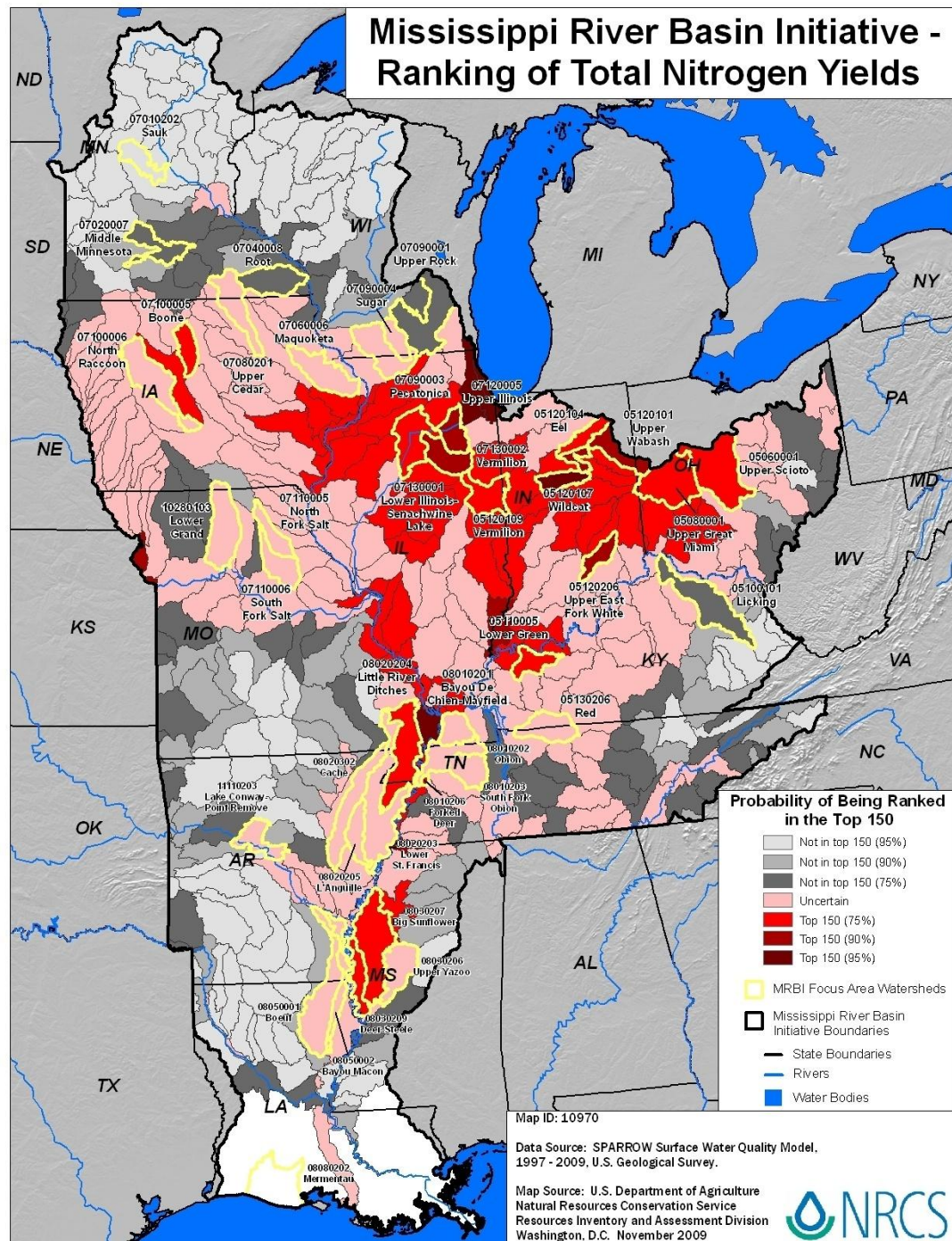
A.

Total phosphorus yields
(kg/km²/yr)





Mississippi River Basin Initiative - Ranking of Total Nitrogen Yields



**QUALITY
IMENTS**

Mississippi River Basin Initiative - Focus Area Watersheds

Map ID: 10957

Data Source: USGS Data, U.S. Department of Agriculture Natural Resources Conservation Service Data

Map Source: U.S. Department of Agriculture Natural Resources Conservation Service Resources Inventory and Assessment Division Washington, D.C. November 2009

Legend:

- MRBI Focus Area Watersheds
- Mississippi River Basin Initiative
- Mississippi River Basin Boundary
- State Boundaries
- Rivers
- Water Bodies

Map Source: U.S. Department of Agriculture
Natural Resources Conservation Service
Resources Inventory and Assessment Division
Washington, D.C. November 2009





Summary – What is different about the MRBI?

- **Dedicated funding in addition to base program = acceleration;**
- **Focus: Resource concerns, watersheds, and conservation practices;**
- **Use of wetlands to complement working lands conservation;**
- **Partner involvement in initiative design;**
- **Competition through RFP's in selecting watershed focus;**
- **Significant partner contributions;**
- **Additional flexibilities in CCPI not available through ongoing programs (for EQIP, WHIP, and CSP);**
- **Payment schedule: income forgone, acquisition of technical knowledge, and producer training; and,**
- **Accountability and assessment, including some funding for edge of field monitoring.**



Conservation Innovation Grants (CIG)

MRBI Funding Categories

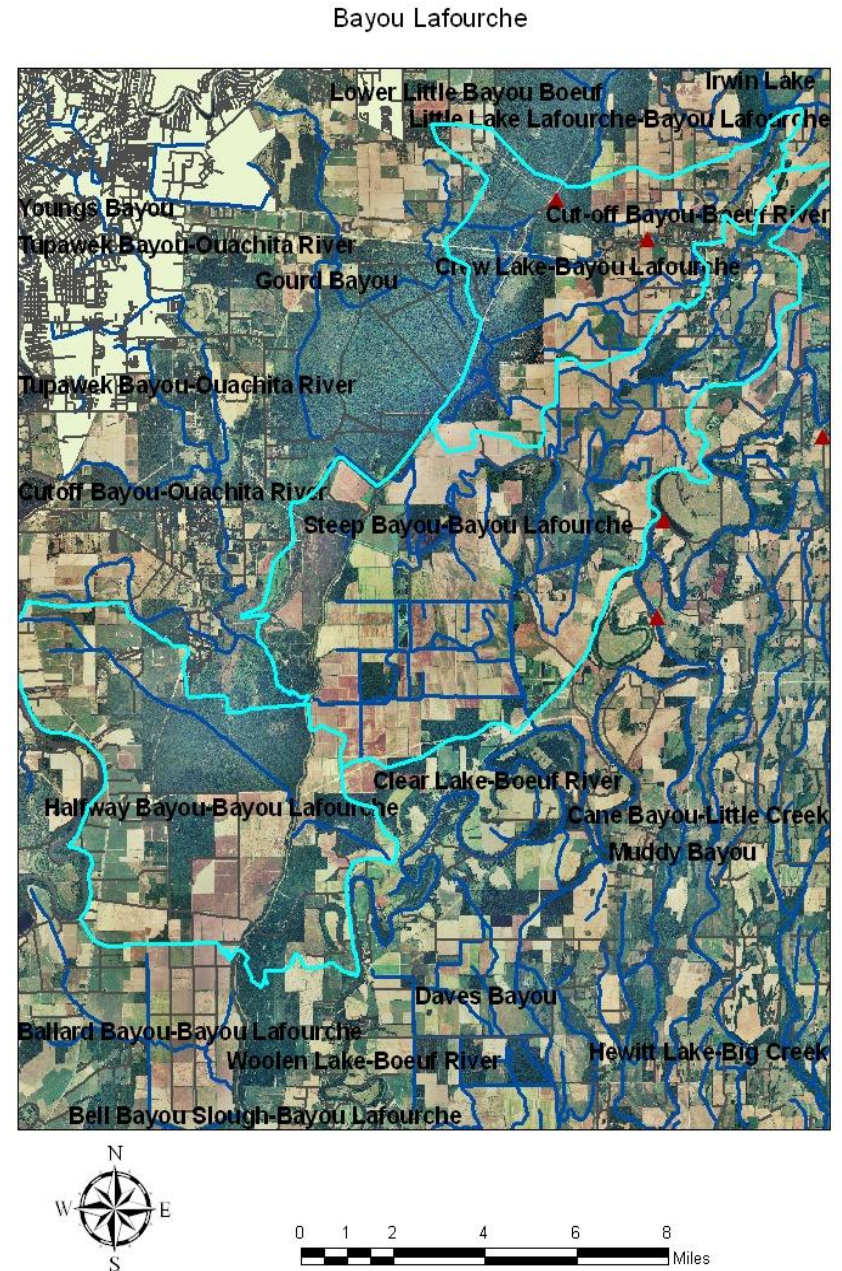
- Water Management**
- Vegetative Practices**
- Nutrient Management**
- Manure Management**
- Adaptive Management**
- Program Outreach**



Types of BMPs

- **Avoiding** – Cover Crops, Prescribed Grazing, Nutrient Management
- **Controlling** – Residue and Tillage Management, Grassed Waterways, Upland Wildlife Habitat Management
- **Trapping** – Riparian Cover, Forest Buffers, Wetland Restoration

- Three 12 digit HUCs in the Boeuf River/Bayou Lafourche Watershed where nutrient reduction BMPs will be implemented in the high priority nutrient loading areas.





Monitoring and Evaluation

Three-Tiered Approach:

- **Field Scale**
- **Small Watershed Scale
(12-digit HUC)**
- **Large Watershed Scale
(8-digit HUC)**

Regional Assessments

Regional assessments funded through the USGS NAWQA Program

Task 1 – Trend reports; completed in 2007; USGS SIR 2007-5090

Task 2 – SPARROW models; began in 2008; completed in 2010

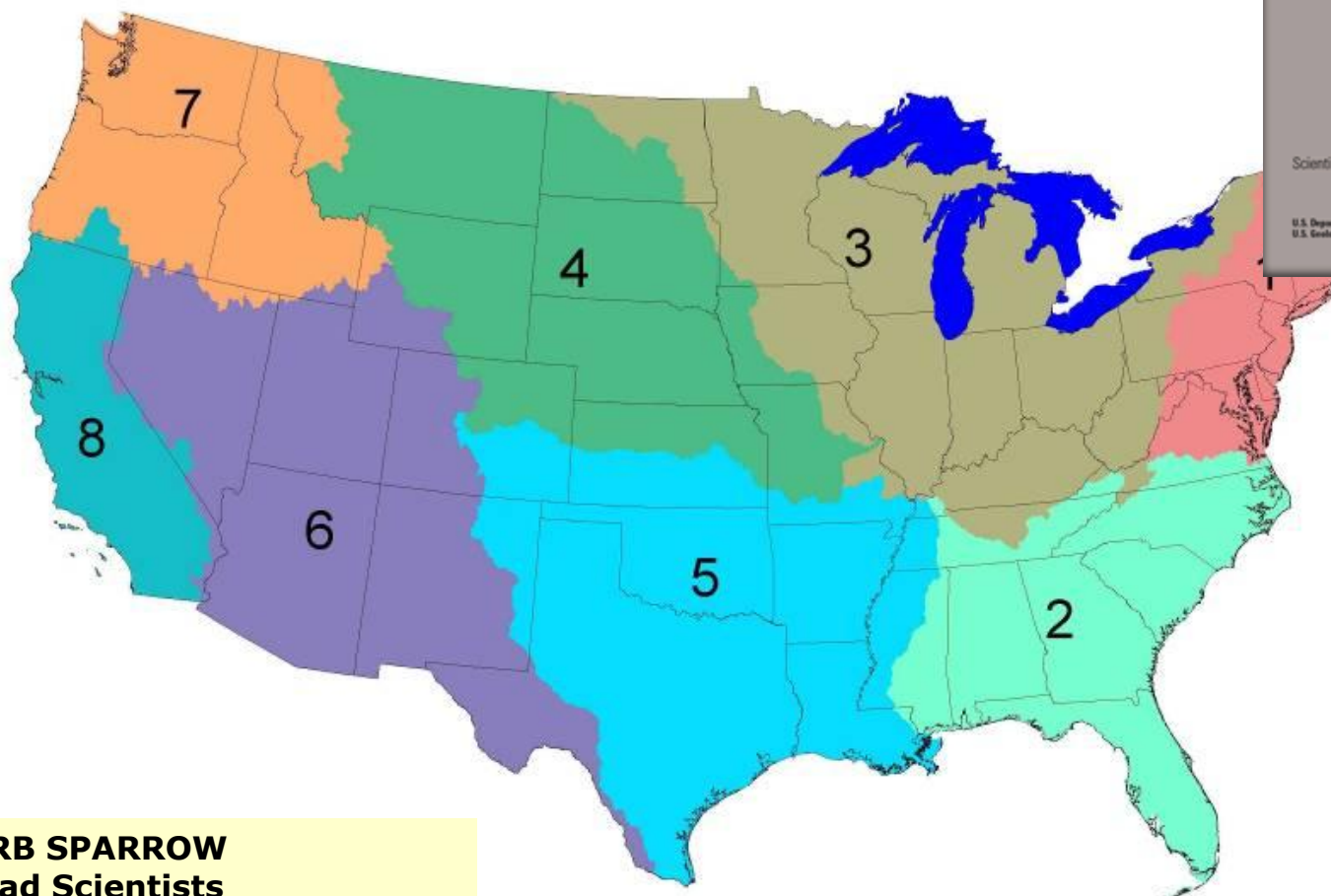


National Water Quality Assessment Program

Trends In Nutrient and Sediment Concentrations and Loads
In Major River Basins of the South-Central United States,
1993-2004

Scientific Investigations Report 2007-5090

U.S. Department of the Interior
U.S. Geological Survey



MRB SPARROW
Lead Scientists
Coordinator – Steve Preston

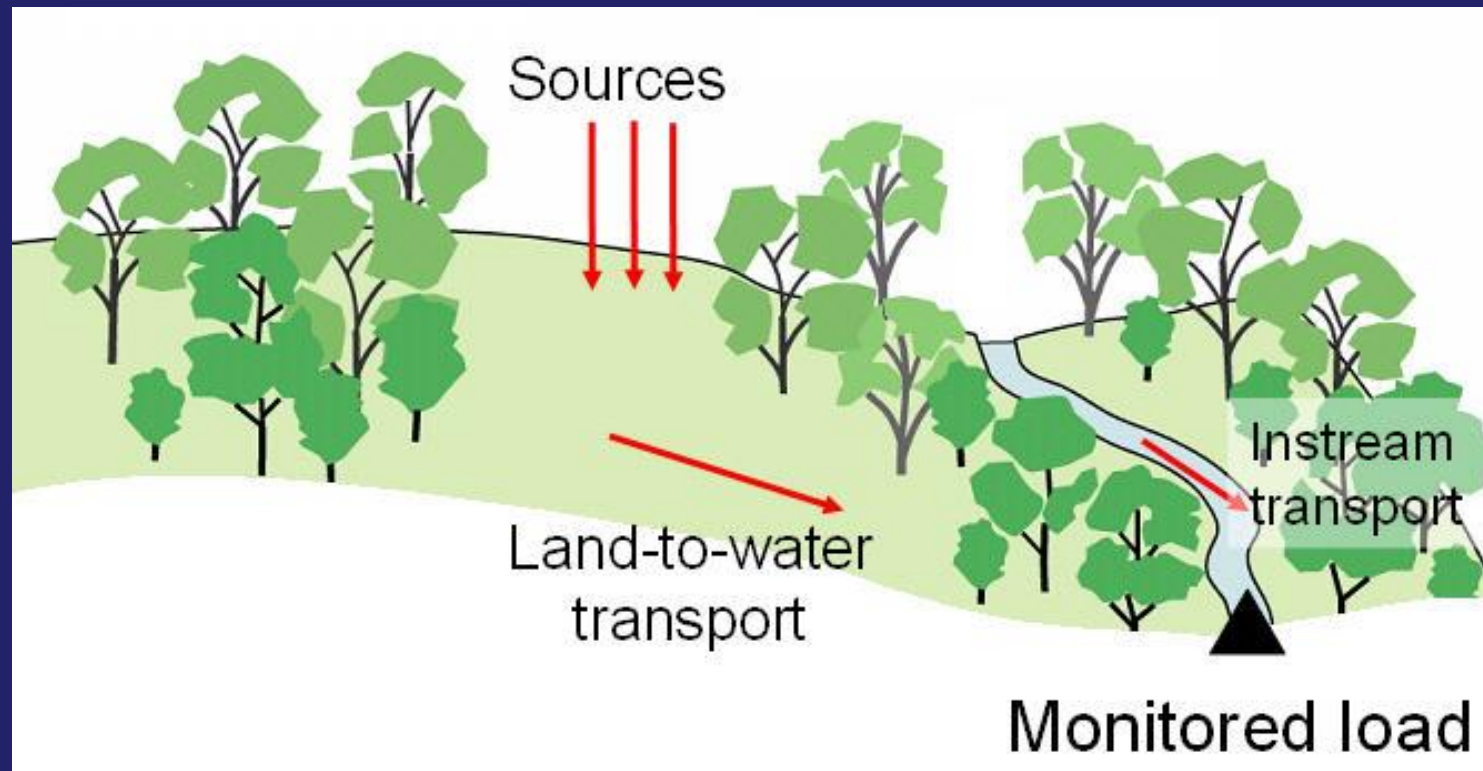


- All regional SPARROW models and support documentation will be published in dedicated series of Journal of American Water Resources Association in 2011
- Lower Mississippi Texas-Gulf SPARROW paper – has received USGS approval has been submitted journal for peer review

What is SPARROW?

- SPAtially Referenced Regression on Watershed Attributes (Smith et al., Water Resour. Res., 1997)
- Regression-based model - model is calibrated and adjusted to monitored loads
- Hybrid mechanistic – includes transport, loss, mass-balance, etc.
- Static model - centered on a specific target year; typically a year where spatial data have been assembled

SPARROW model concept

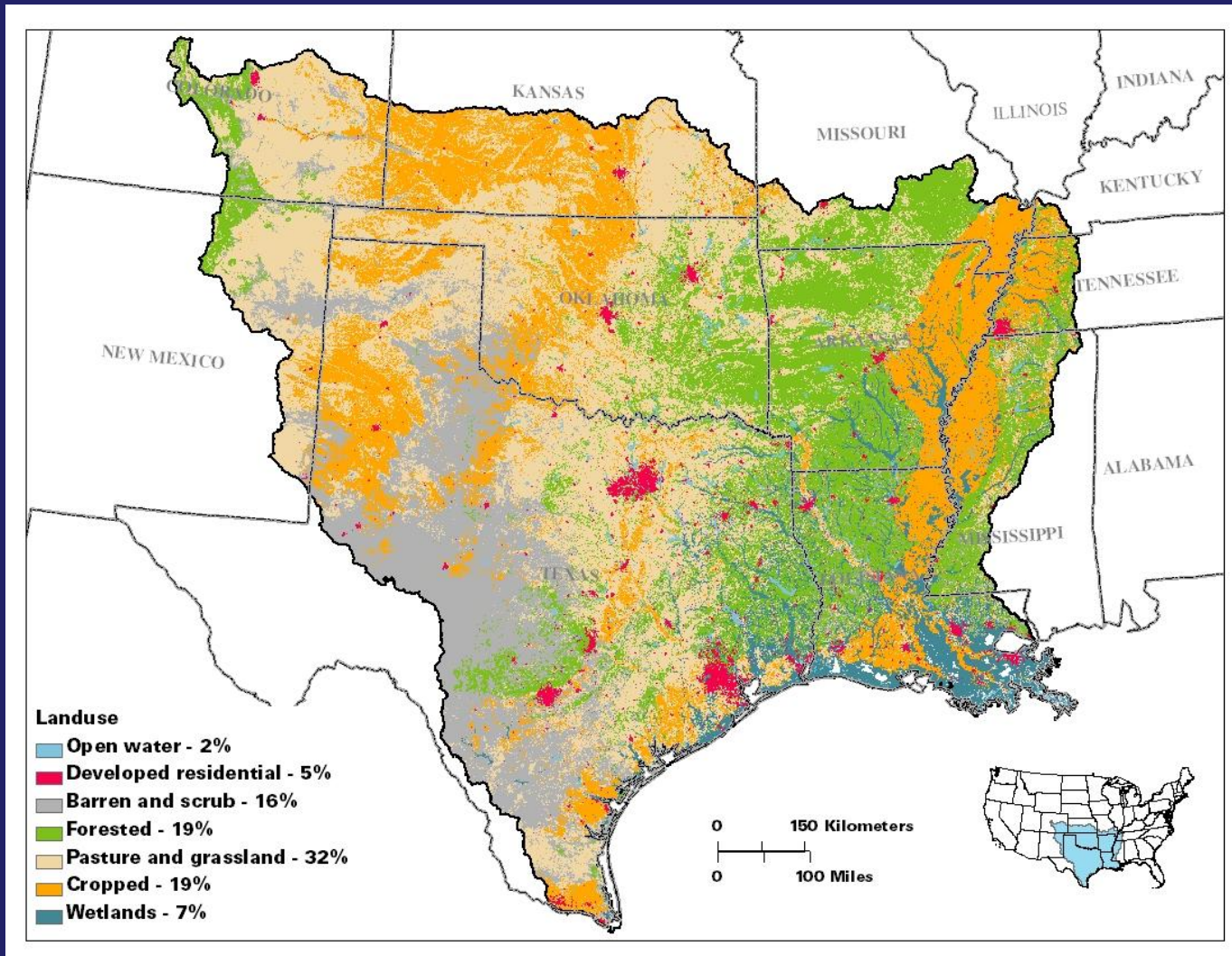


Study Area

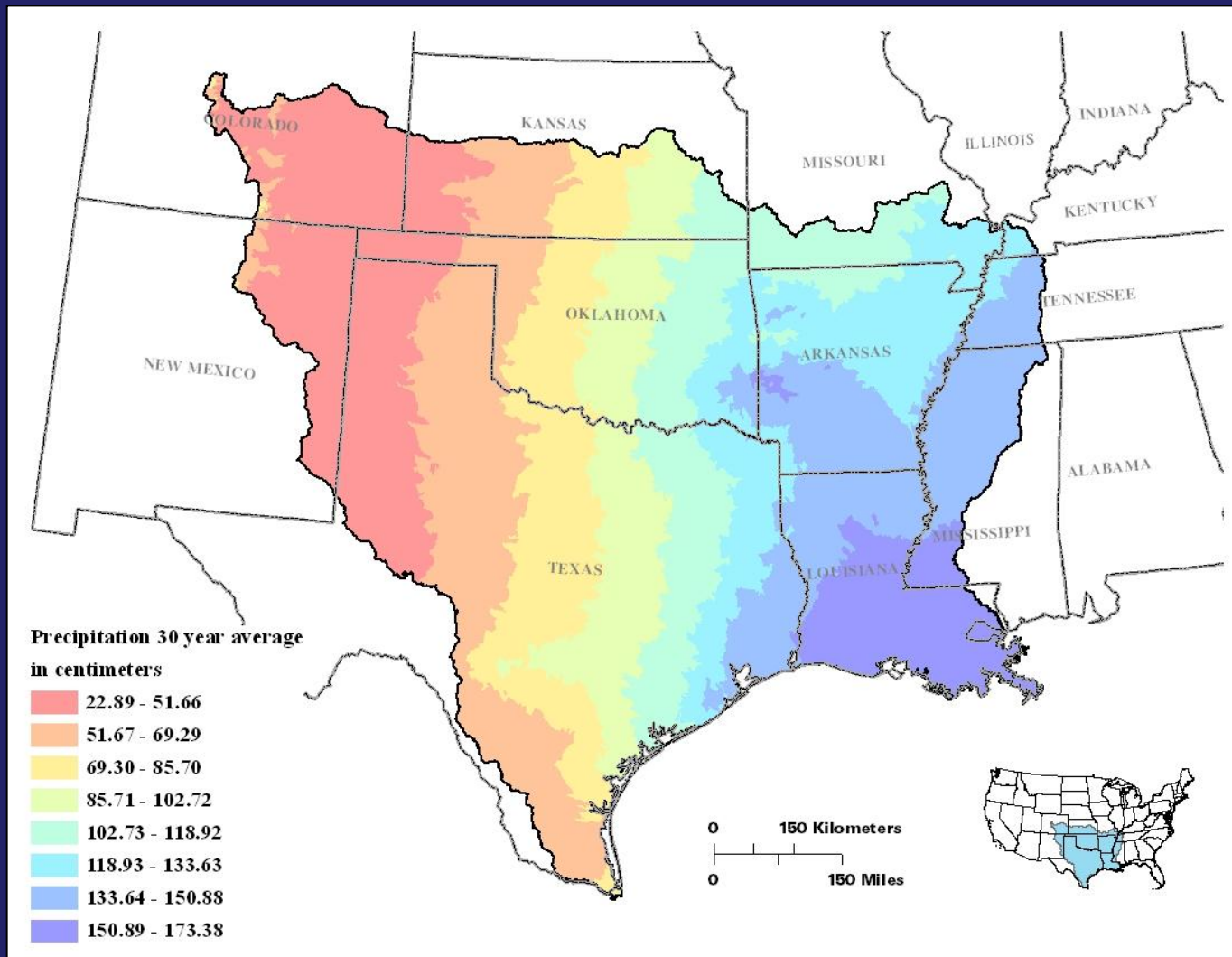
- South-Central United States – Lower Mississippi, Arkansas-White-Red, and Texas-Gulf Basins
- 11 States
- USGS Study Area Team:
 - Richard Rebich, MSWC
 - Natalie Houston, Patty Ging, and Evan Hornig, TWSC
 - Scott Mize, LWSC



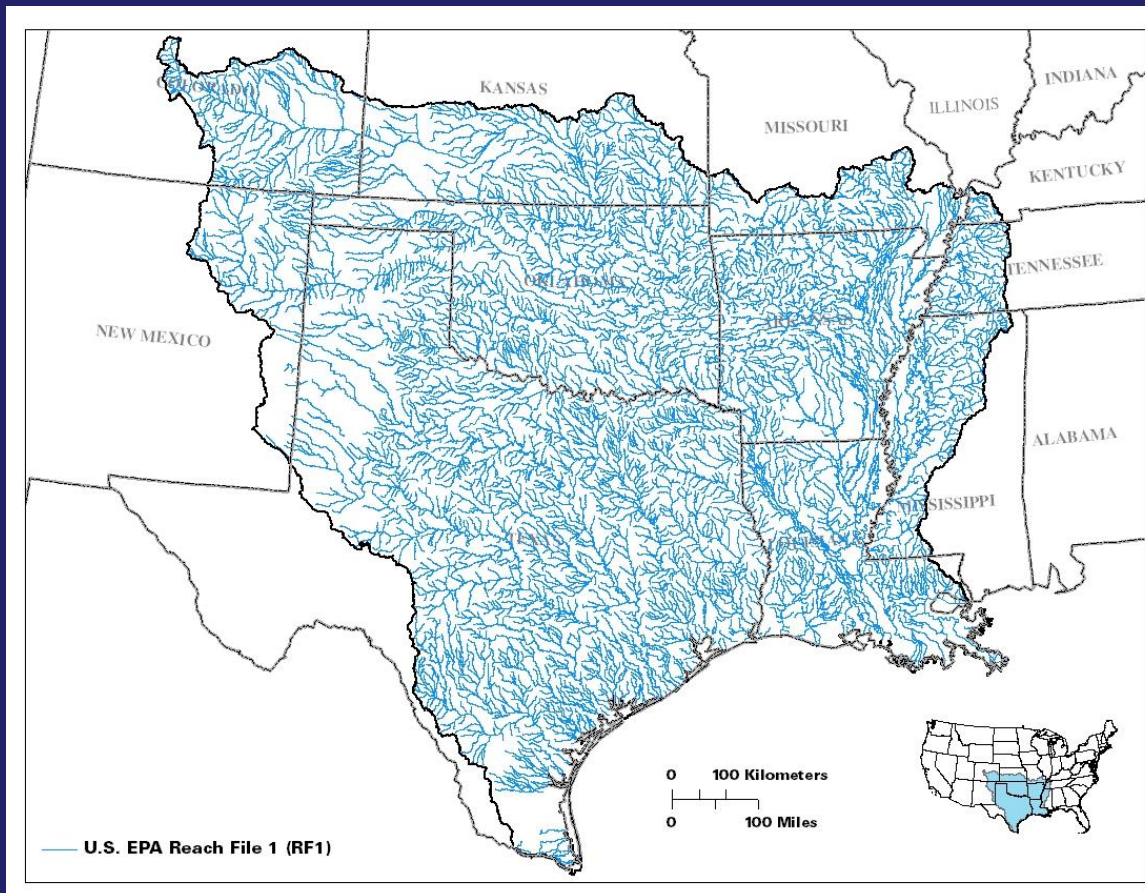
Land Use



Rainfall



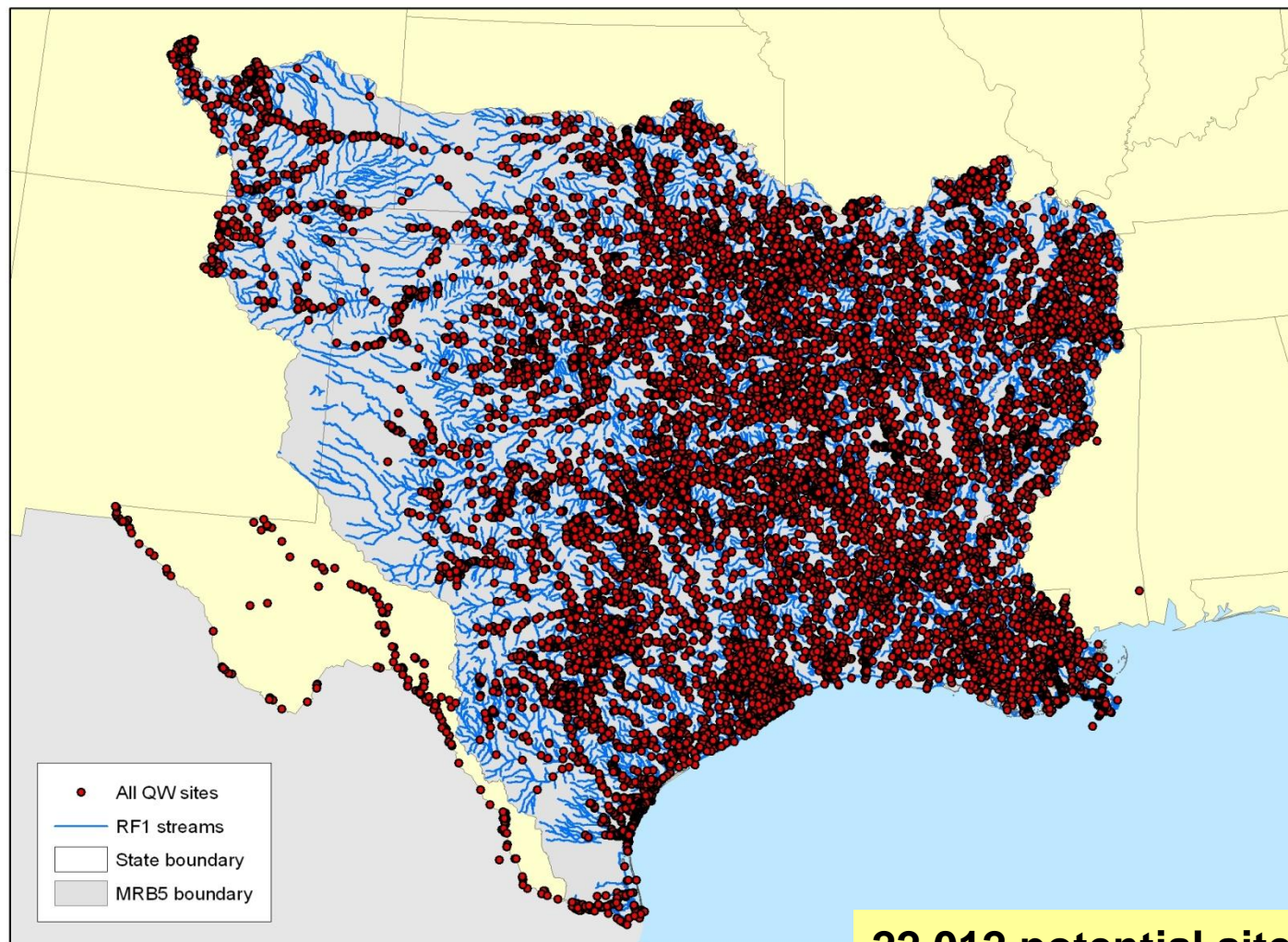
Starts with reach network



The E2RF1 digital stream network from the U.S. Environmental Protection Agency was used for this study

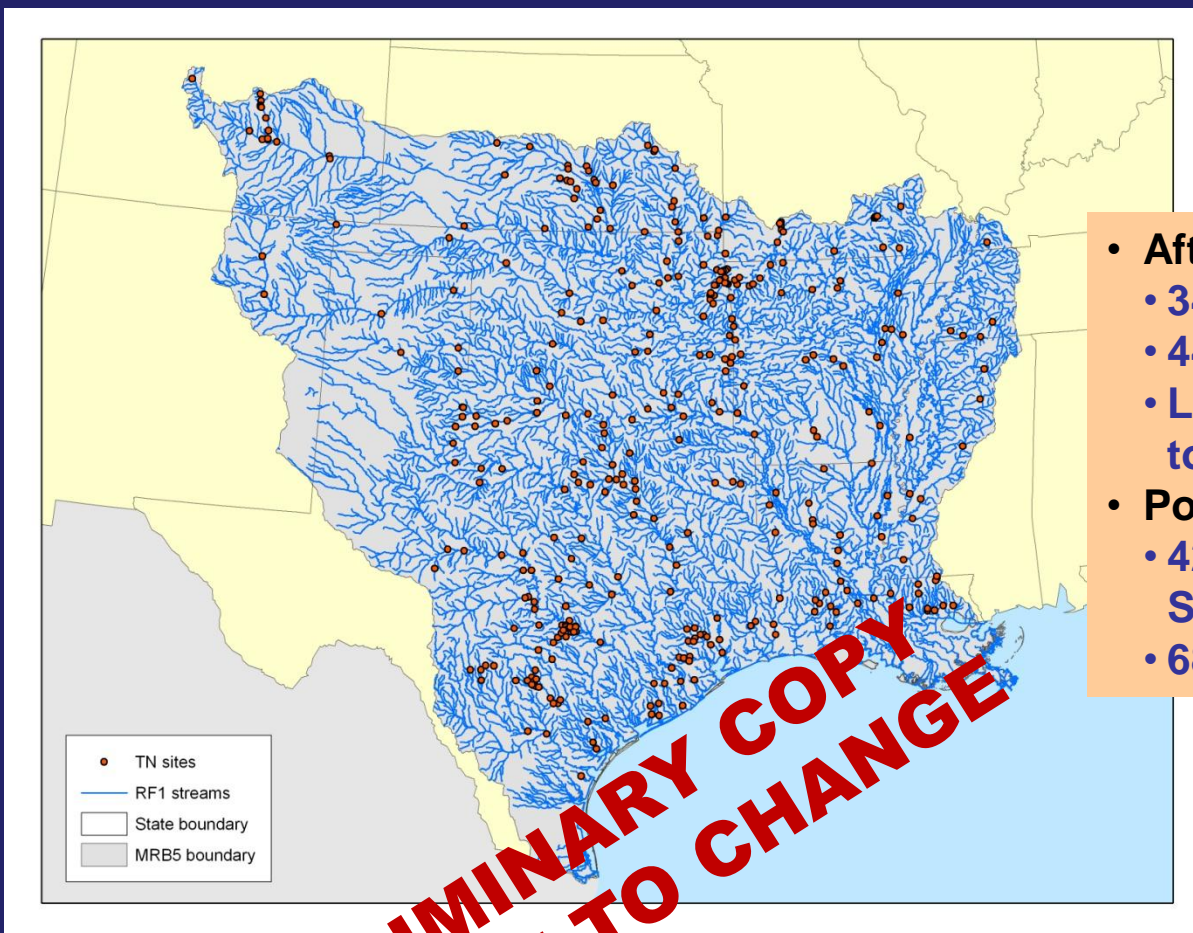
There were 8,375 stream reaches and catchments in the study area

Sites with water-quality data



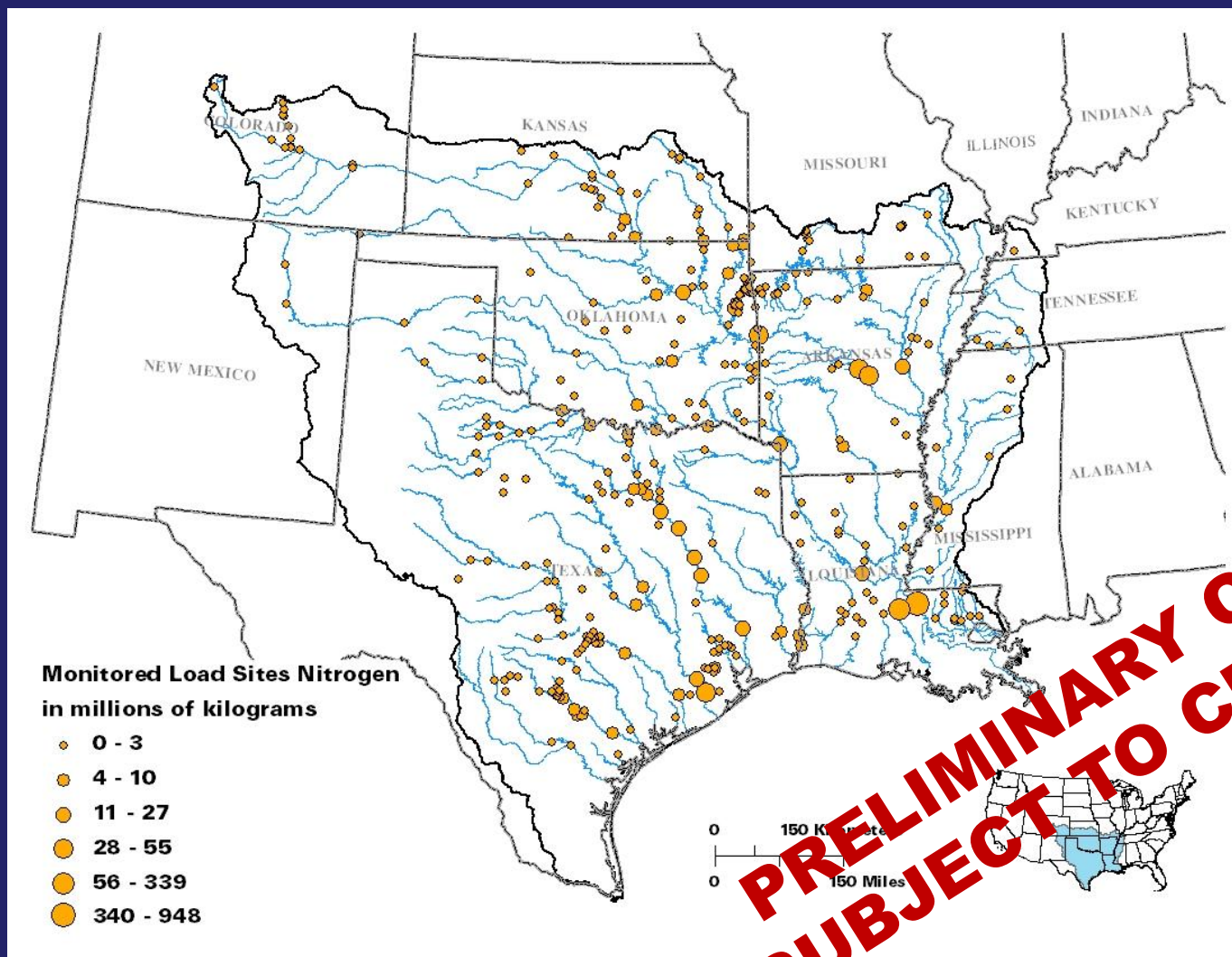
22,012 potential sites

Final Load Sites

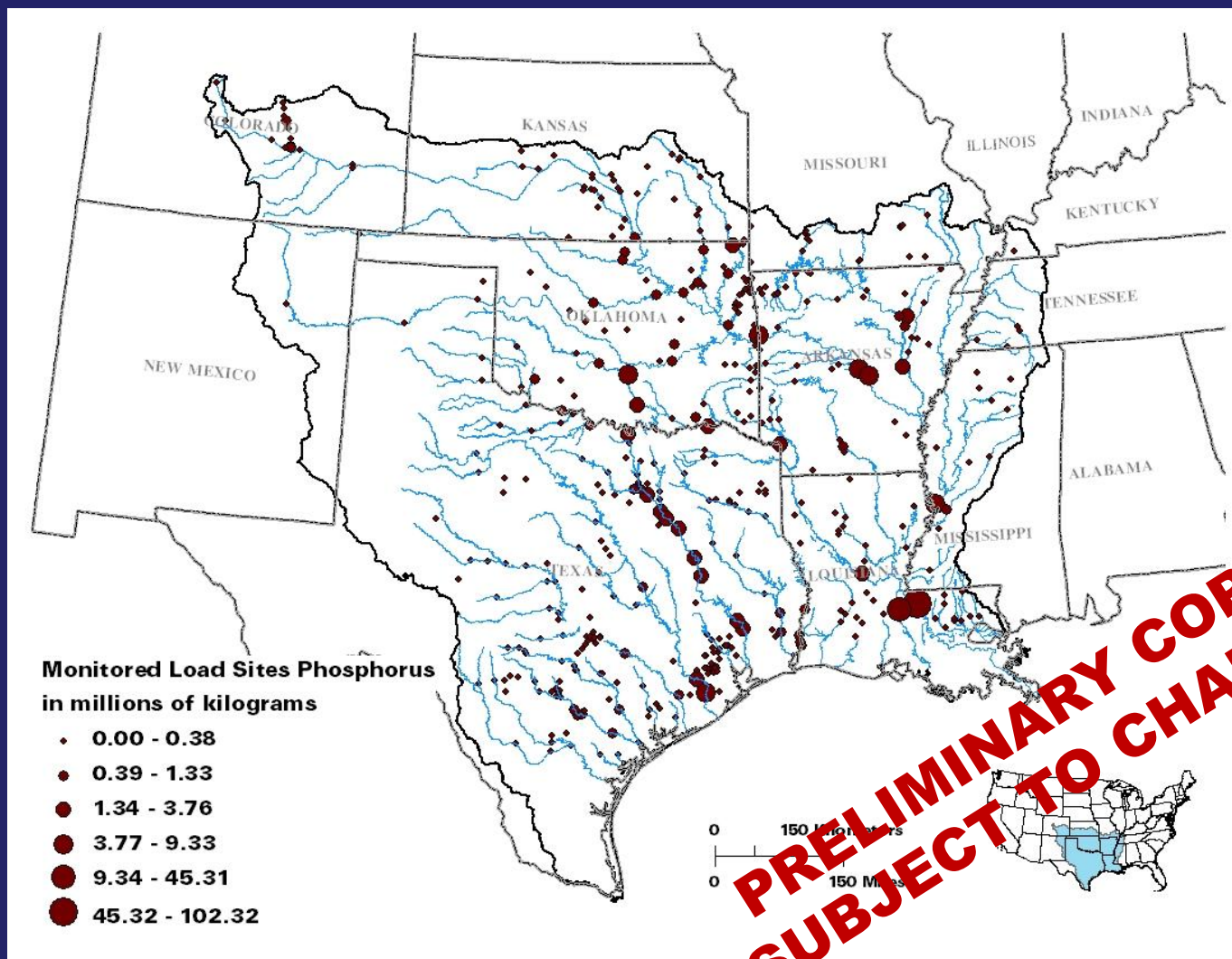


- After flow gage match,
 - 344 total nitrogen sites
 - 442 total phosphorus sites
 - Load estimates de-trended to 2002
- Point of reference,
 - 425 total sites in National SPARROW model
 - 68 were in the study area

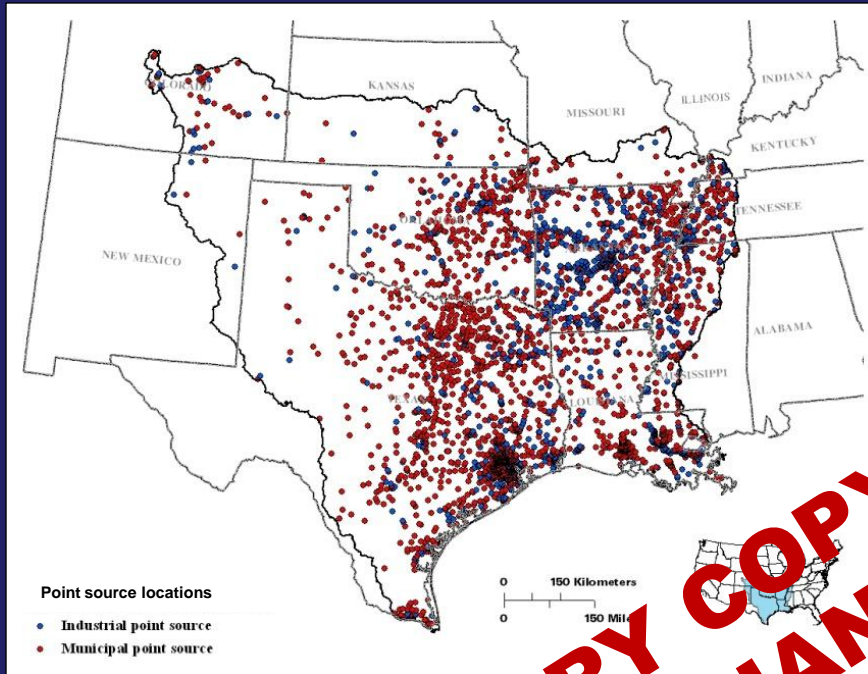
Range of total nitrogen load at monitored sites



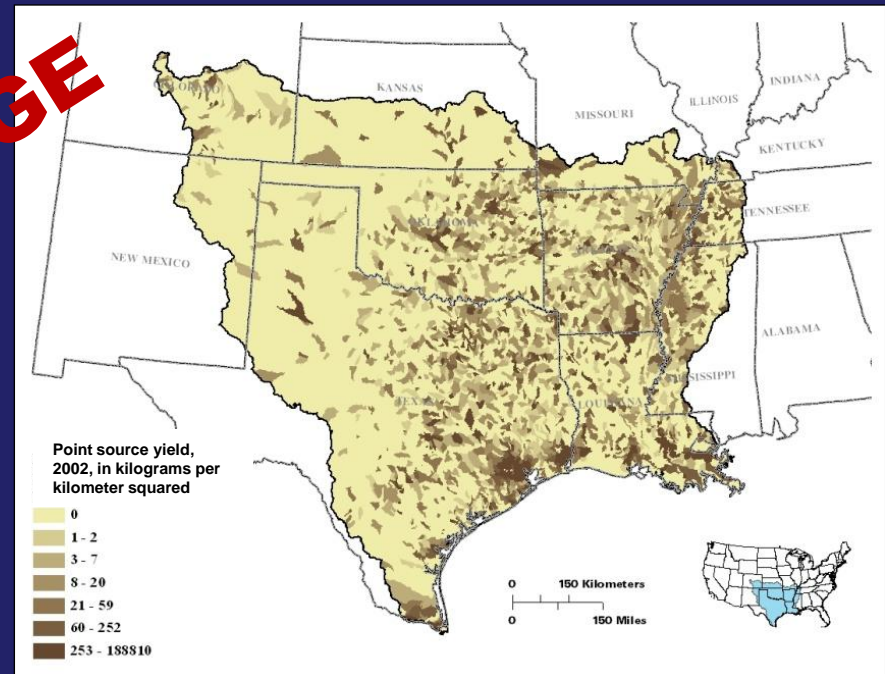
Range of total phosphorus load at monitored sites



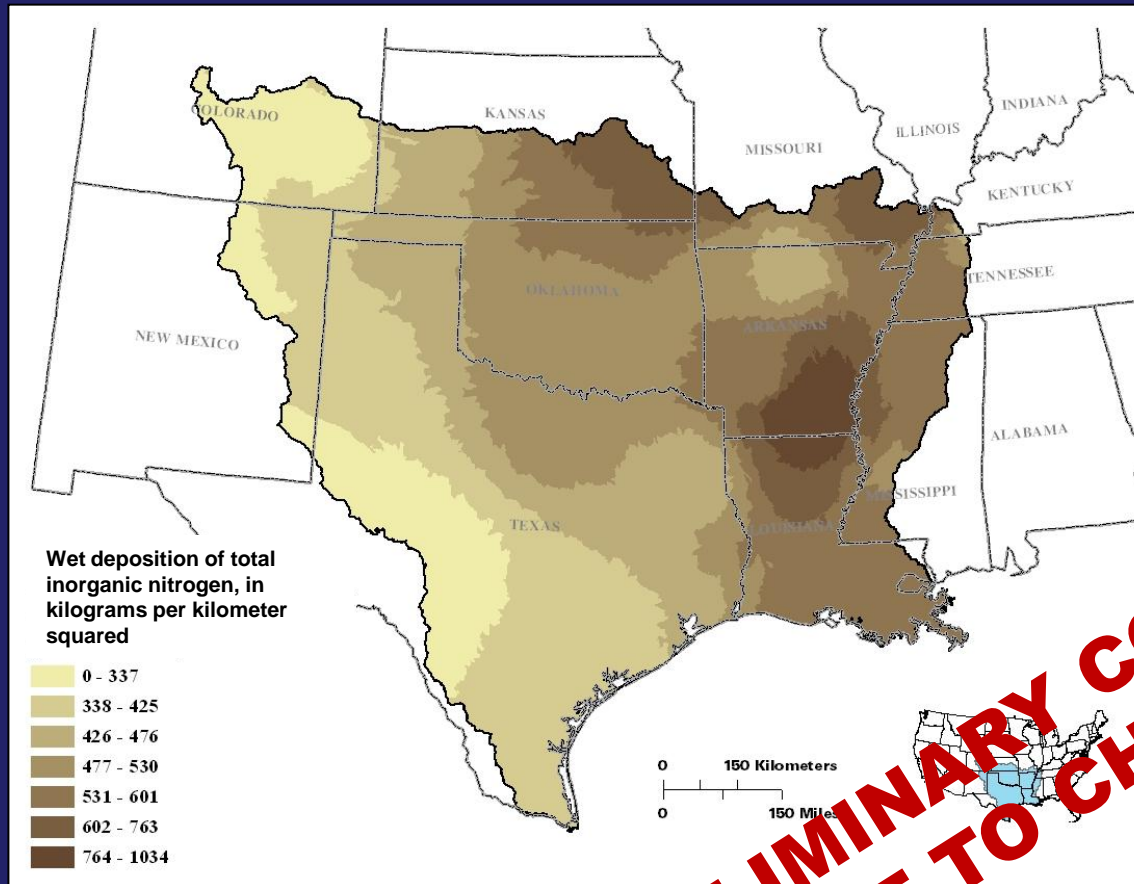
Point Sources



- Data from USEPA's Permit Compliance System
- Used actual load data where available
- In unavailable, load data were estimated



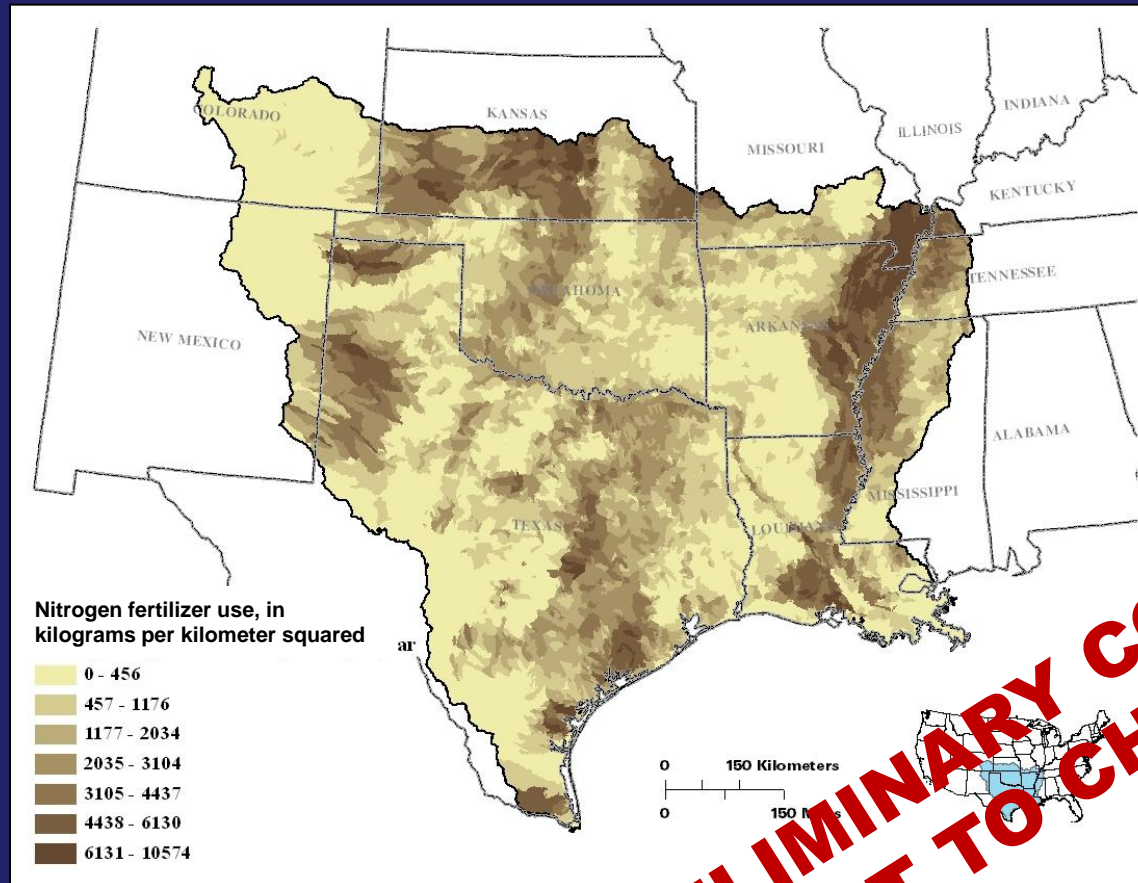
Atmospheric Deposition



- Data from 28 active USGS NADP/NTN wet deposition sites in the study area
- Data used in the model are total inorganic nitrogen
- Mostly ammonia, some nitrate
- De-trended to 2002

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SUBJECT TO CHANGE**

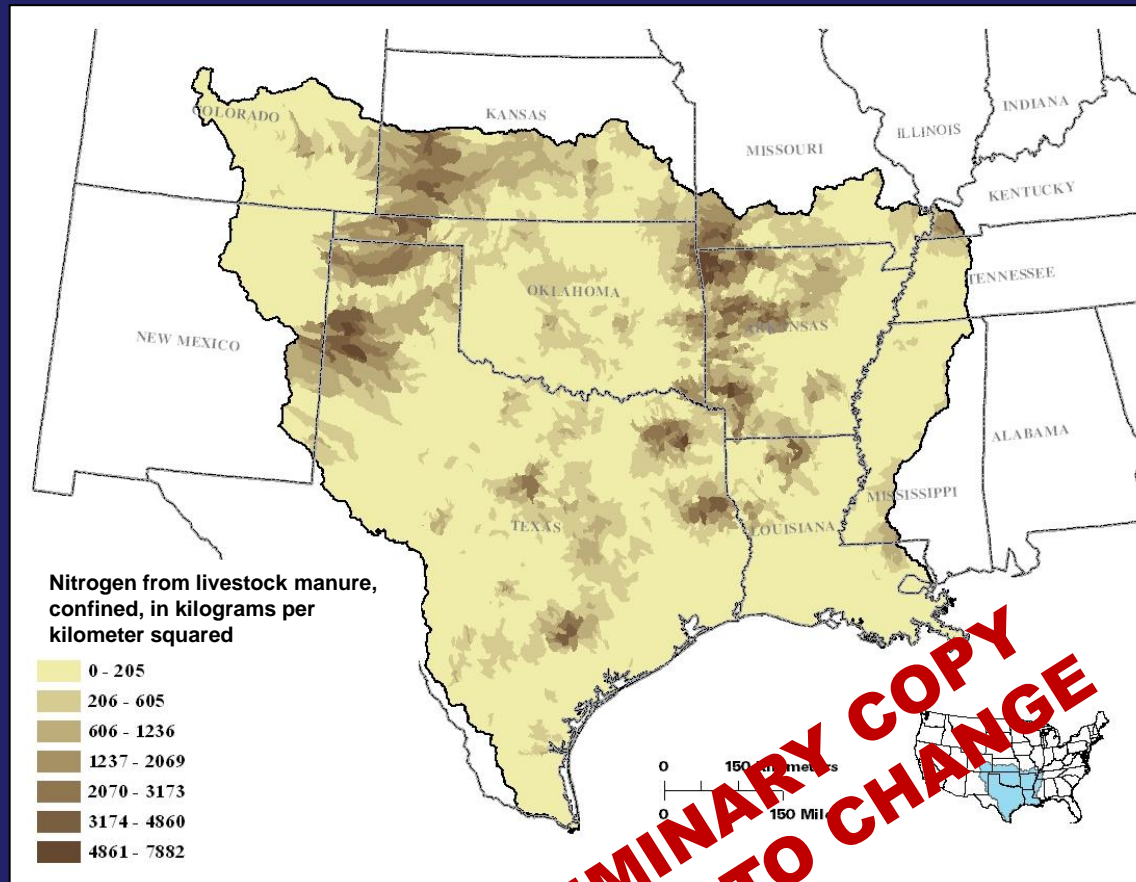
Fertilizer applied to crops



- Data from USDA NASS service
- County level sales data
- Data are available annually

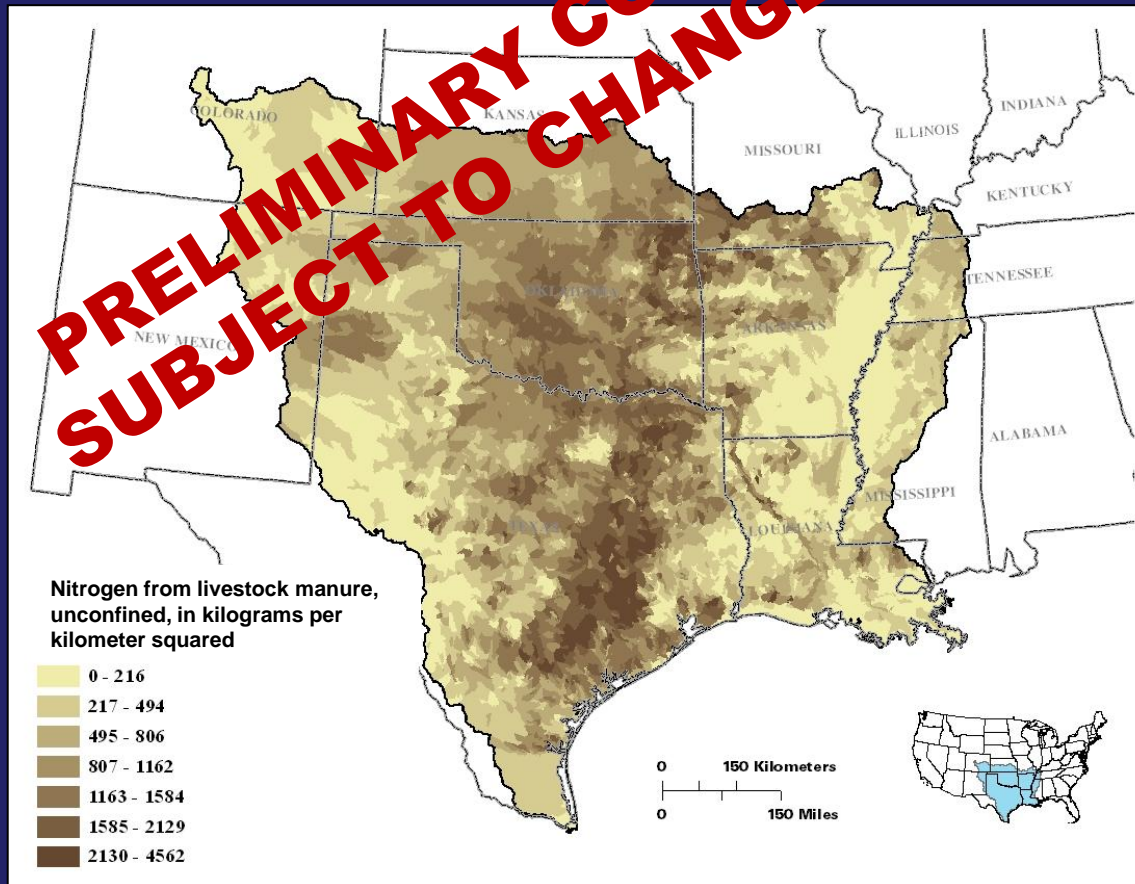
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Livestock Manure from Confined Feeding Operations



- Data from USDA NASS service
- Livestock manure generated at feeding operations (confined) applied to crops
- Data are available every 5 years

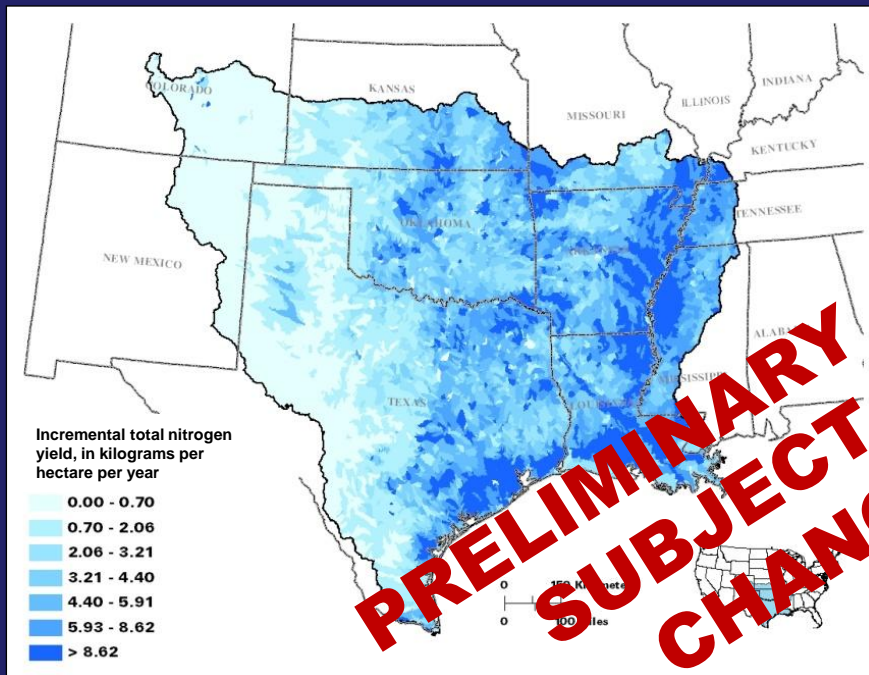
Livestock Manure from Pastures (unconfined)



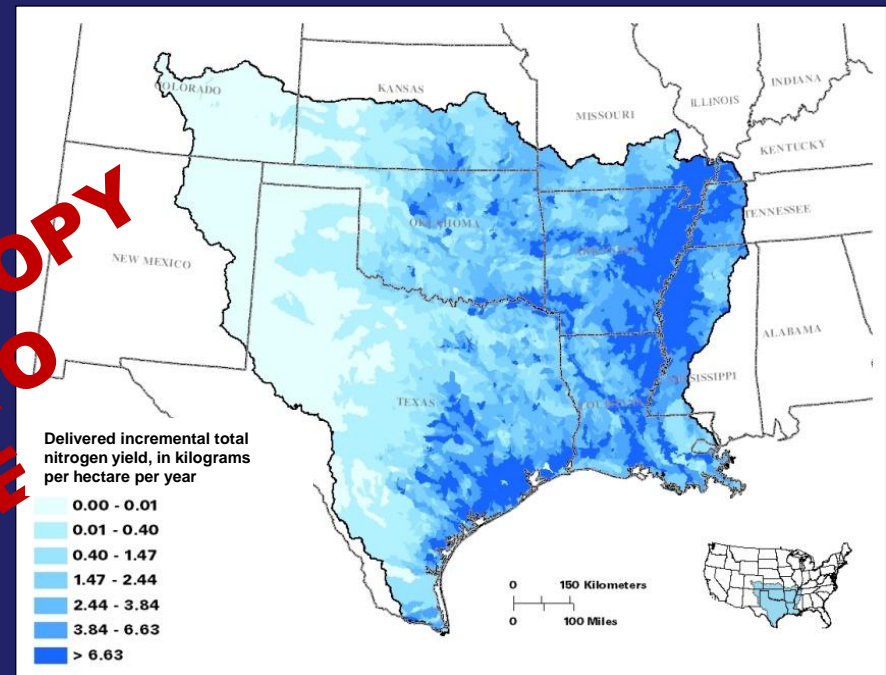
- Data from USDA NASS service
- Livestock manure generated from pastures (unconfined)
- Data are available every 5 years

Total Nitrogen Yield Results

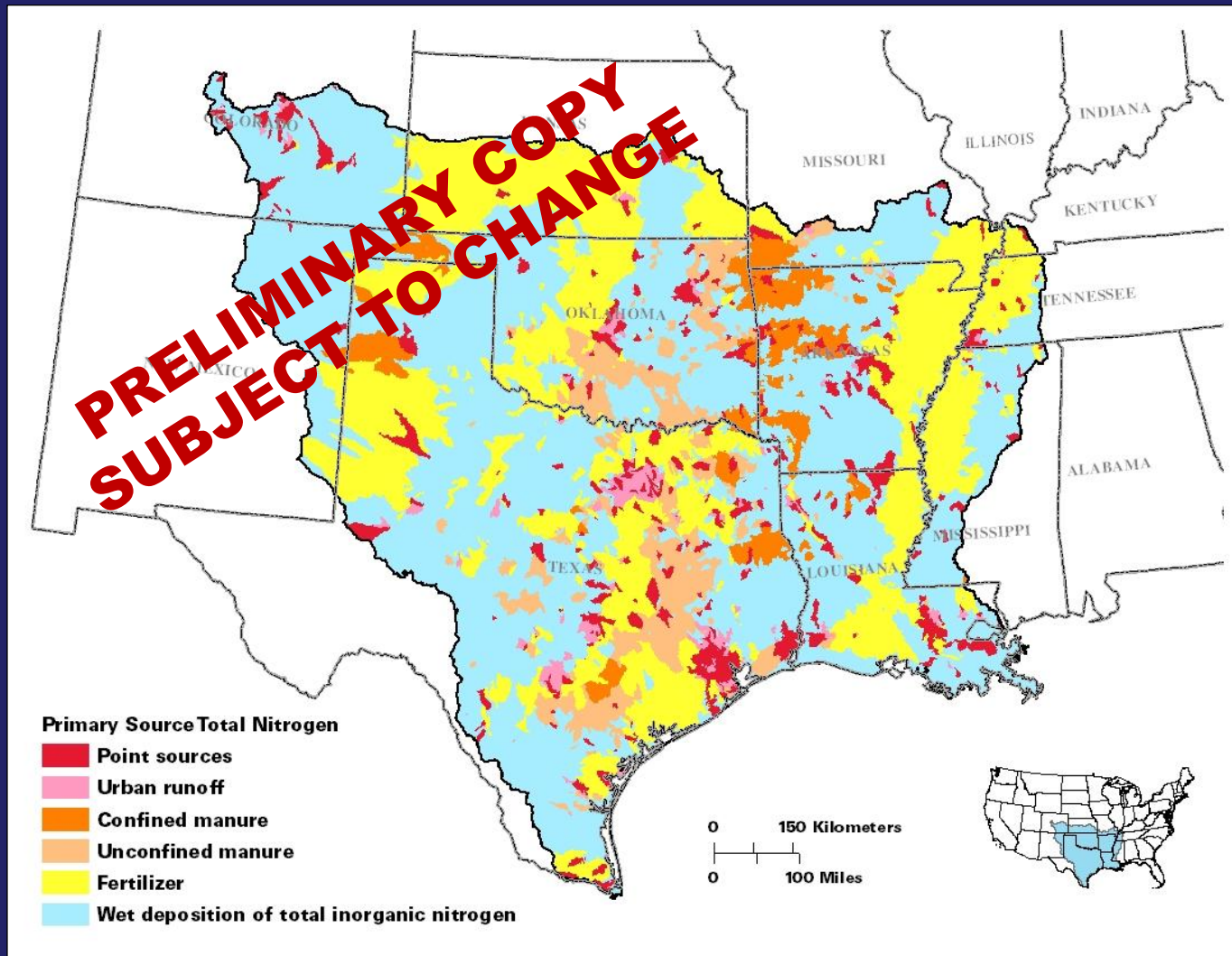
Delivered to local streams



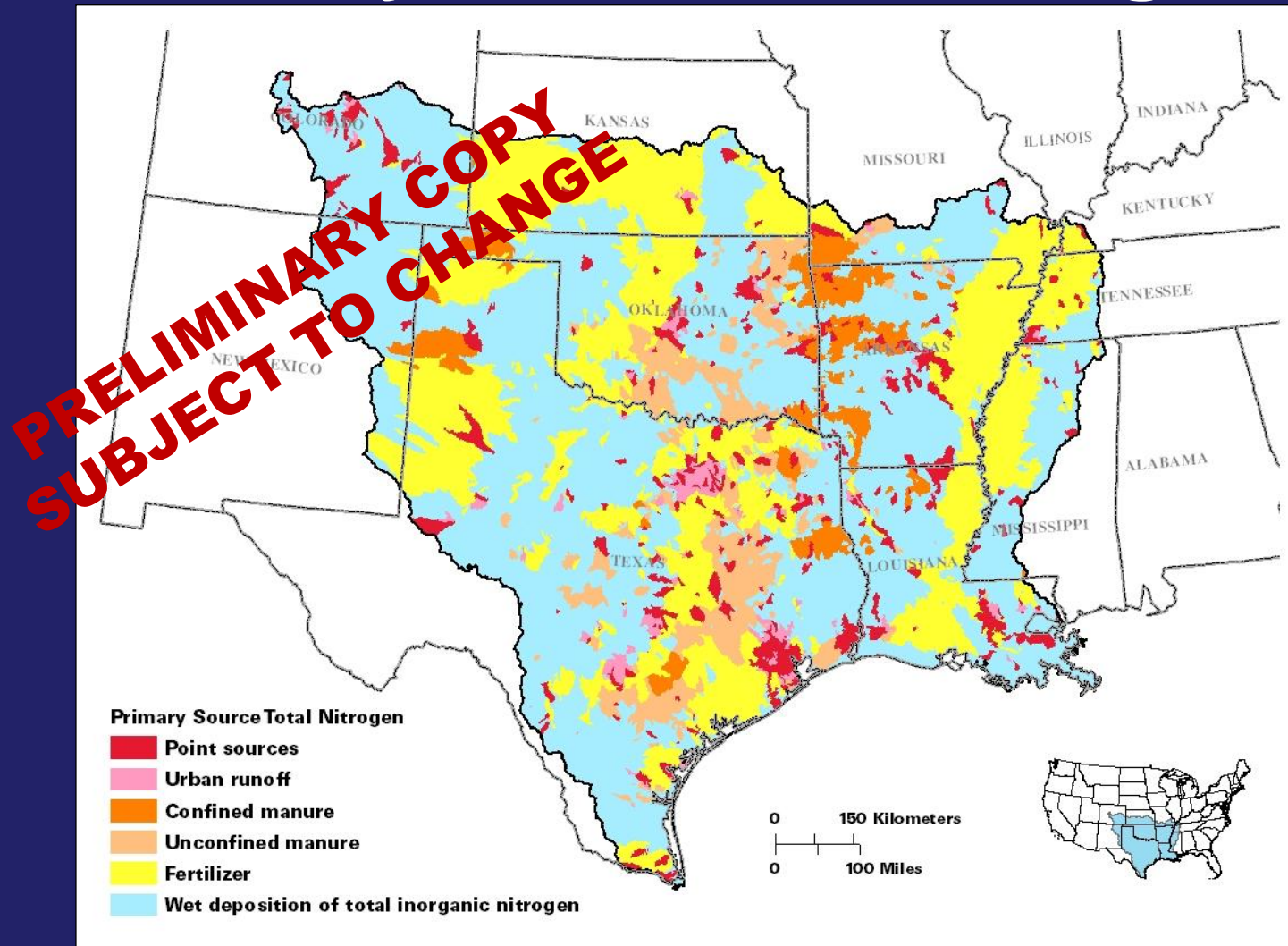
Delivered to the Gulf of Mexico



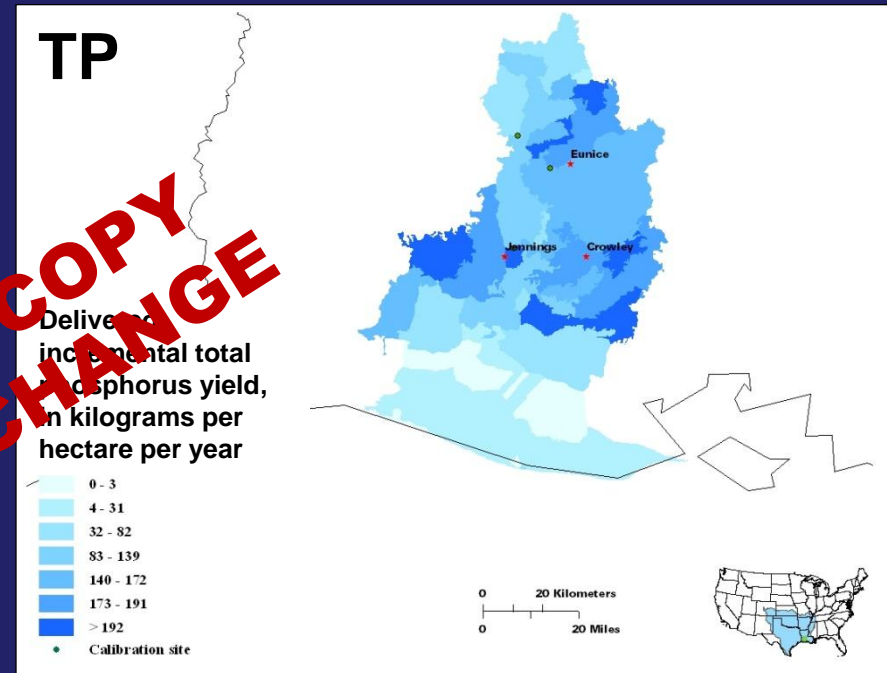
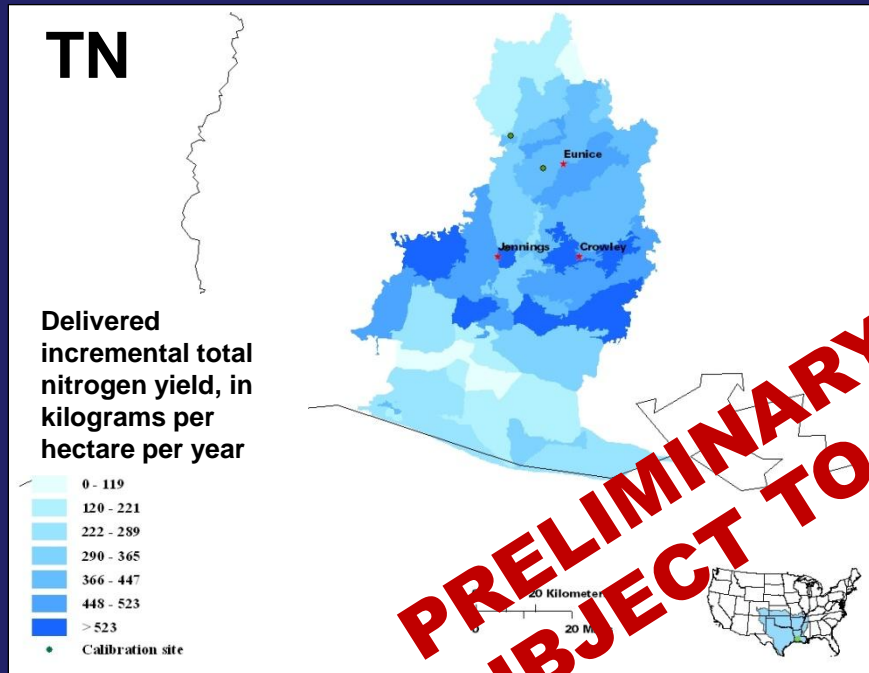
Primary Sources of Nitrogen



Primary Sources of Nitrogen



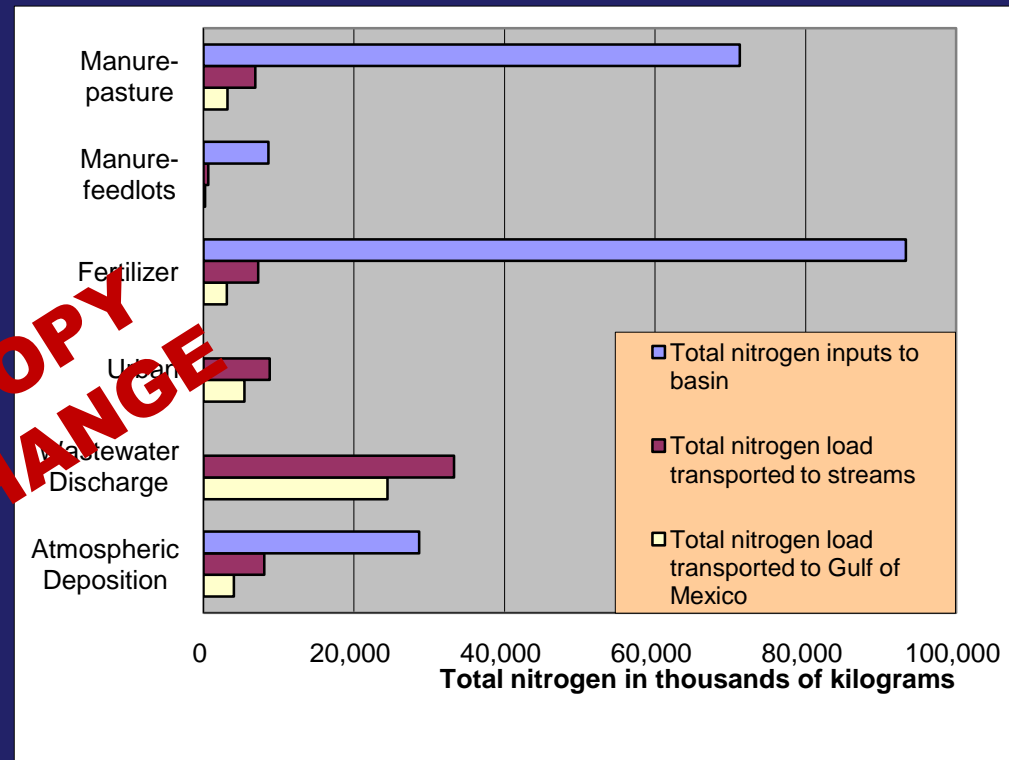
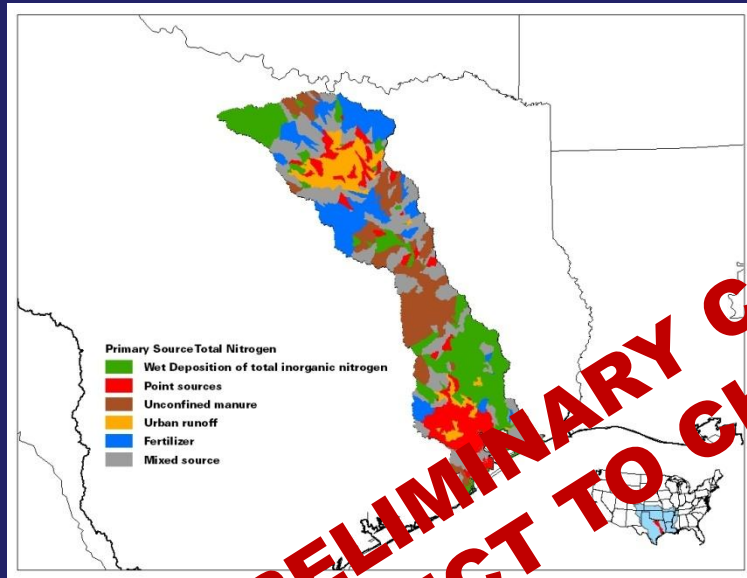
Delivered Incremental Yields Maps by Watershed



Mermentau River watershed

Other watershed-specific examples . . .

Source plots and bar charts

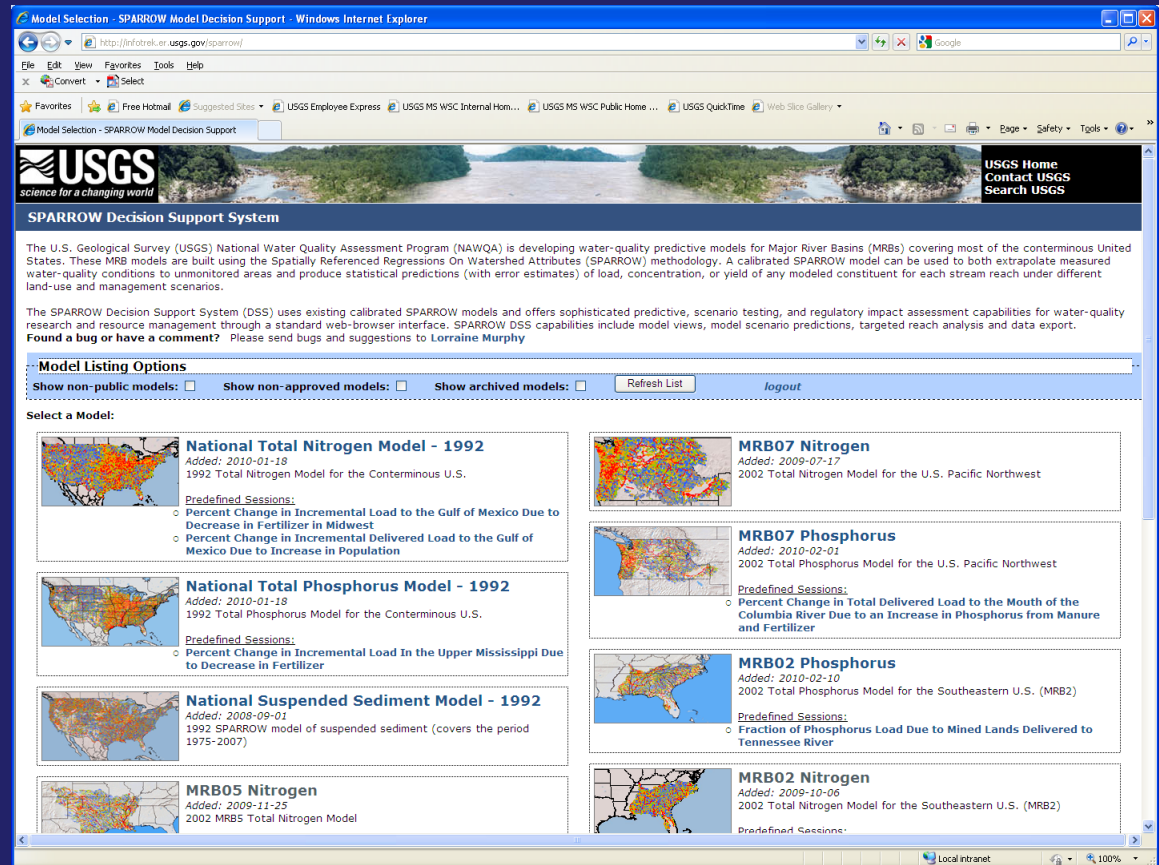


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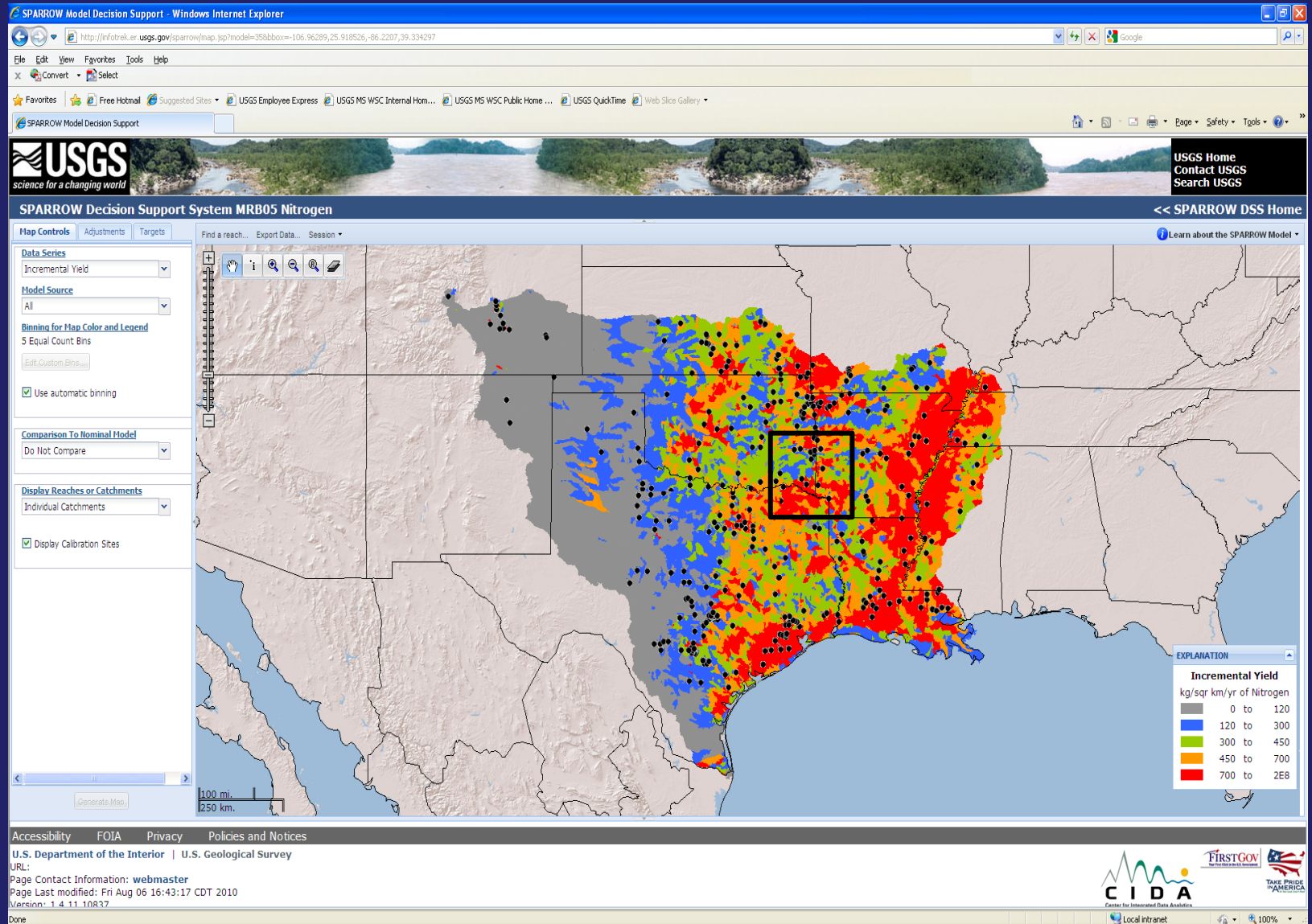
Nutrient Models-Decision Support Tools

Applications

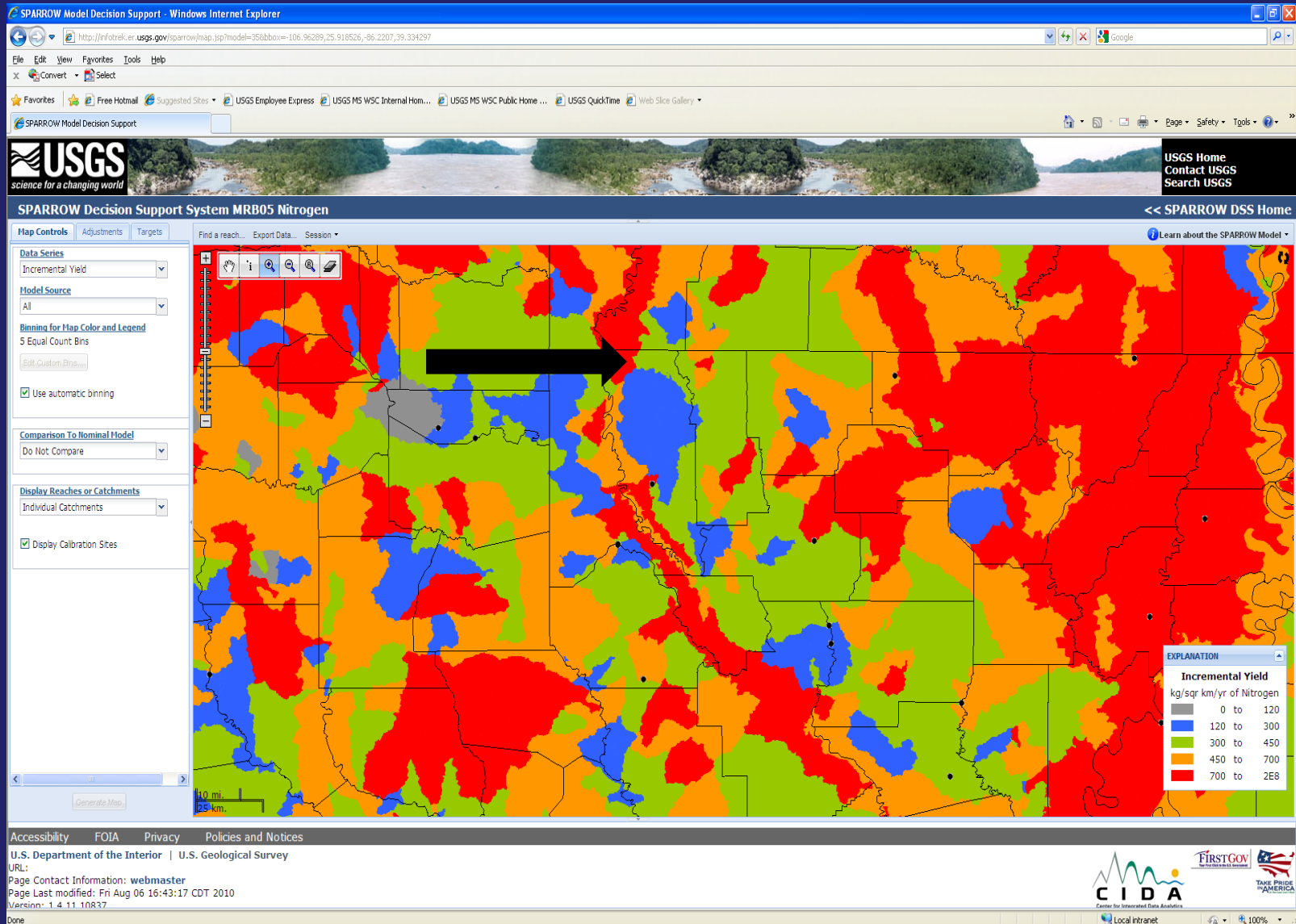
Modeling decision support tools is being developed to enable managers to evaluate management scenarios and the associated environmental response and also incorporate economic aspects into the scenarios.



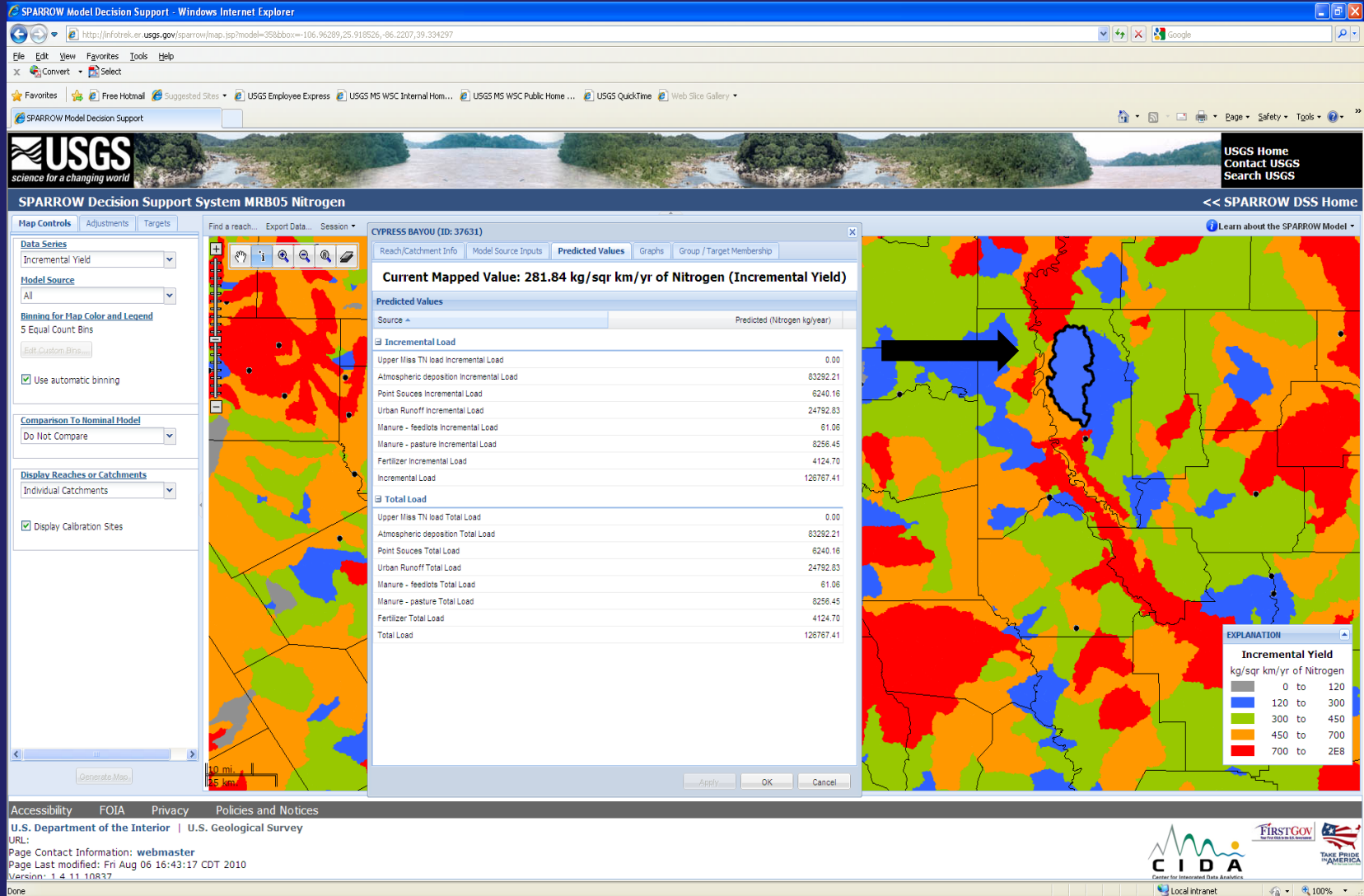
DSS tool



DSS tool

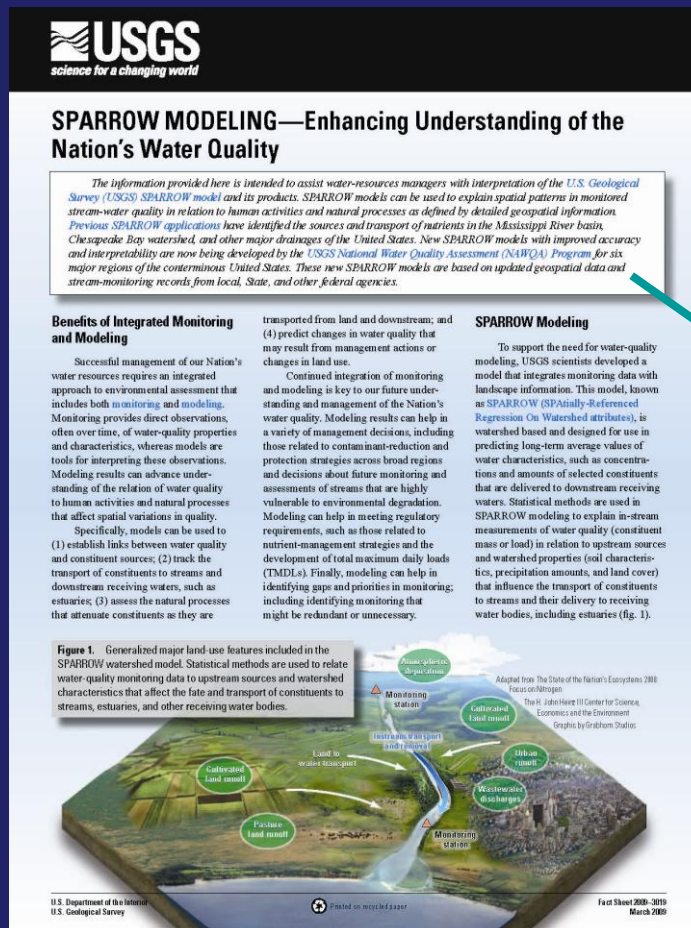


DSS tool



SPARROW Fact Sheet

- For more information about model concepts:



SPARROW home page:
<http://water.usgs.gov/nawqa/sparrow/>

SPARROW fact sheet:
<http://pubs.usgs.gov/fs/2009/3019/>



Strategies for Other NPS Sources

- **LDEQ funds projects on individual home sewage systems, urban storm water runoff, sand and gravel mining and forestry activities and will be working on nutrient reduction strategies for each of the major sources of nutrients.**



Senate Concurrent Resolution

- In May 2010, the Louisiana legislature enacted Senate Concurrent Resolution 40 to request that the U.S. Congress support and continue investment in the Mississippi River Gulf of Mexico Watershed Nutrient Taskforce and alleviating hypoxia in the Gulf, citing the MRBI.



A Parting Shot: Lake Martin in Louisiana



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